SERIES 3—Vol. 2, No. 7 JULY, 1919

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Annual Subscription Ten Dollars in Advance,
Single Copies One Dollar.

PUBLISHED MONTHLY BY THE OPHTHALMIC PUBLISHING COMPANY,
7 West Madison Street, Chicago, Illinois.

Entered as Second Class Matter January 1st, 1918, at the Post Office, Chicago, Ill., under the act of March 3rd, 1879.

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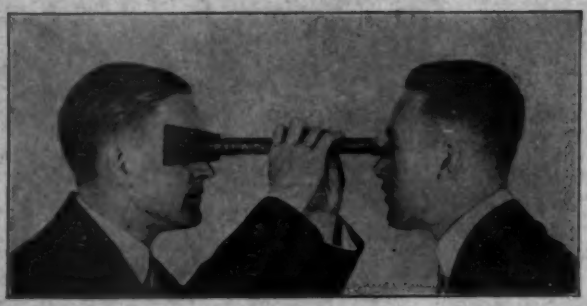

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DETACHMENT OF RETINA IN TOXEMIA OF PREGNANCY. (CLAPP)

AMERICAN JOURNAL OF OPHTHALMOLOGY

Vol. 2 JULY, 1919 No. 7

DETACHMENT OF THE RETINA IN ECLAMPSIA AND TOXEMIA OF PREGNANCY.

C. A. CLAPP, M. D., F. A. C. S.

BALTIMORE, MD.

This paper reports a series of cases seen in Maternity Hospitals (case VI in Johns Hopkins) of Baltimore in a period of sixteen months; representations of the fundus appearances presented in each of the twelve eyes.

While lesions of the eye, extending thru all of the different tissues from the conjunctiva to the optic nerve have been reported with more or less frequency in albuminuria of pregnancy and its allied conditions, it is extremely rare to find any mention of detached retina. Of the various text books upon the eye, Weeks[1] mentions its occurrence but not its frequency; Parsons[2] Pathology of the Eye, under heading of pregnancy, does mention retinal detachment as being occasionally present; and under bibliography refers to an article by Del Zoppo and Soli[3] in which they call attention to the rather close association between genital conditions and eye lesions, and cite a report by Baduel[4] of a woman who had a small detachment of the retina in five succeeding pregnancies, with complete reattachment following each delivery.

De Schweinitz[5] speaks of the changes in general being a widespread "neuroretinitis with hemorrhages and exudates. Martin Cohen[6] reports a case of double detachment in a colored woman of twenty-six, which showed two discs below each nerve head, a typical detachment of the retina. One week later the detachments were much less in extent and eventually reattached completely. Rochon-Duvigneaud[7] claims that some depreciation of vision of permanent nature occurs in 13.33 per cent of albuminuric cases, and that retinal detachment is of frequent occurrence. The Encyclopedia of Ophthalmology says "This is a very rare lesion and probably due to long, difficult labor. Chance[8] believes that these albuminuric cases are not nephritic, as the kidney does not show an inflammation; but a degeneration of retinal epithelium, while ophthalmoscopically neuro-retinitis with hemorrhages and exudates are seen. He makes no mention of retinal separation. While other cases are undoubtedly on record I have been unable to locate them.

I have examined the eyes of practically all of the albuminuria and toxemia cases, occurring in the past fourteen years at the Maryland Lying-In Hospital, and have not observed detachment of the retina until recently. Six cases have presented themselves since December 1917, whose histories briefly are as follows:

CASE I.—R. W. (white), age 35. Second pregnancy.

Family history: Father died at forty-five from nephritis; one sister died at twenty-nine from diabetes; one brother died at thirty-one from some kidney trouble.

Present history: Had pronounced edema of legs at sixth month of pregnancy which became gradually worse. On December 17, 1917, vision became dim and on the evening of the 19th she went to bed with headache and vomiting. She was seized with a convulsion about midnight, having eleven convulsions before entering the hospital at 4

a. m., and followed by five within the hospital.

Upon admittance patient's tongue was much swollen, with presence of general edema. B.P. 180/110. Child was delivered still born at 11 a. m. Urine showed presence of albumin without casts.

I first saw the patient at 2 p. m. on December 20, 1917, making the following notes: "Patient has been getting morphin and pupils are contracted, so that it was necessary to dilate pupils before examining fundus. Examination by direct method shows in O.D. general edema of retina, with dark prominent veins, especially above nerve head, with some exudates and hemorrhages, and with appearance of flat detachment of retina below; but patient very restless during examination. O.S. shows general retinal edema but no exudates or hemorrhages." Patient was put on general eliminative treatment, hot packs, etc.

December 22, 1917, direct examination with dilated pupils shows large typical detachment of retina above and one below in right eye, with marked edema of retina, while left eye shows large detachment below disc. See Plate X, A, and Fig. 1.

Fig. 1. Case I. Left eye. Retina detached below.

December 27, 1917, with undilated pupils no detachment could be made out above in O.D., and both lower detachments seem to be lessening.

December 29, 1917, pupils dilated. Upper detachment in O.D. has entirely disappeared, while lower one is regaining fundus reflex. O.S. shows greater elevation than right with few hemor-

rhages above macula and general retinal edema with disturbed choroidal pigment.

January 1, 1918, pupils somewhat dilated but react to light. Both lower detachments appear as flat elevations with entire disappearance of hemorrhages and exudates.

February 25, 1918, examination at office showed slight pallor of each nerve with numerous pigmented areas thruout fundi, especially pronounced near right macula; no raised retina. Vision: Right eye, $+0.50 = 20/50$; left eye, $+0.50 = 20/70$.

March 23, 1918, fields normal: no change ophthalmoscopically. Vision: Right eye, 20/30—; left eye, 20/20—.

CASE II.—I. P., (white), age 31.

Family and past history, negative.

Present history: Has had normal pregnancy until five weeks ago, when she began having some disturbance of vision which has gradually become worse. Patient entered hospital March 28, 1918, and was delivered on the 29th; child cyanosed. Blood pressure on entering 180/120, with pulse rate of 120; Wassermann negative. Functional kidney test on April 26, 1918, showed 50 per cent in first hour and 25 per cent in second hour. April 10, urine showed albumin trace. Child died of inanition on April 4, 1918. Pulse on entering hospital 125, on leaving 90. Blood pressure 150/115. Clinical diagnosis was eclampsia, with chronic interstitial nephritis.

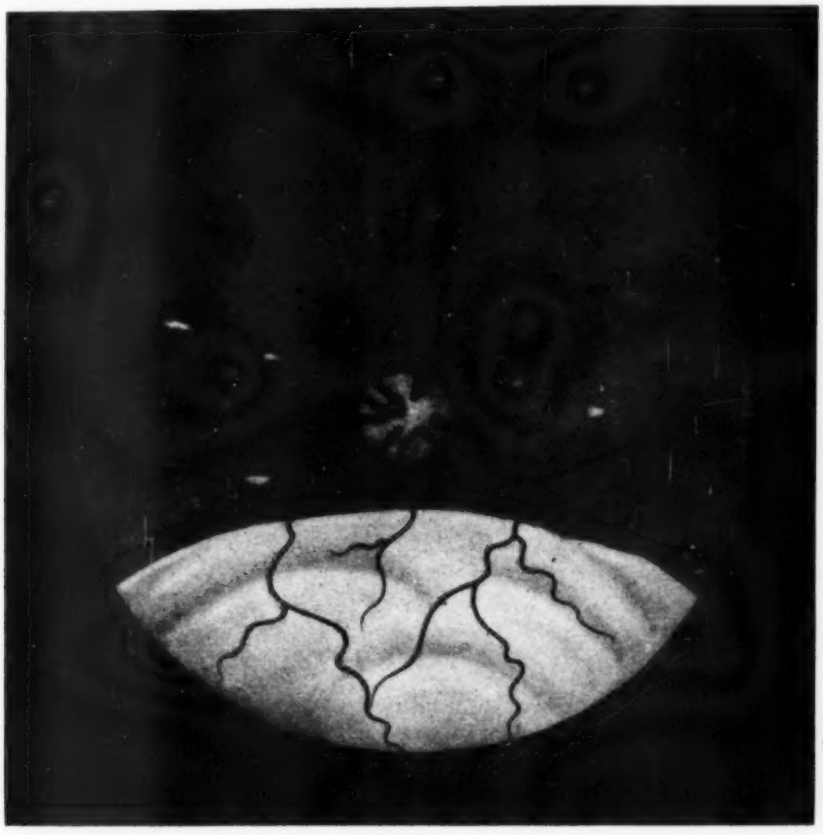

Fig. 2. Case II. Left eye. Retinal hemorrhages and exudates, and detachment below.

Eye examination April 1, 1918. Direct ophthalmoscopy with dilated pupils showed swelling of each nerve head, marked fullness and tortuosity of retinal vessels, pronounced retinal

edema. Three disc diameters below each nerve head is a large classical detachment of the retina, being a little larger in the right eye. Plate X, B.

Examination of eyes on April 6, no change was seen. April 13, 1918, same condition as at first examination, with the addition of numerous exudates and hemorrhages about right nerve and left more elevated than at first. April 16, 1918, detachment in R larger with increase of tortuosity of vessels and also hemorrhages and exudates. See Plate X, B, and Fig. 2. April 23, 1918, no noticeable change with exception of a ½ star-shaped figure at temporal side of right macula and also at nasal side of left macula. April 27, 1918, no change in ophthalmoscopic picture.

May 7, 1918, both detachments appeared smaller with very numerous hemorrhages and exudates and blurred nerves; exudates at macula less marked. June 10, 1918, V.:

O.D. —1.00 ⊃ —1.00 cyl. ax. 180 = 2/200.

O.S. —1.00 ⊃ —1.00 cyl. ax. 180 = 20/200. No detachment could be made out, but neuro-retinitis still existed with some laying down of connective tissue, especially along vessels. July 22, 1918, V.:

O.D. —1.00 ⊃ —1.00 cyl. ax. 180 = 20/40—.

O.S. —1.00 ⊃ —1.00 cyl. ax. 180 = 20/100. Nerve heads still indistinct, but with good color, few exudates and hemorrhages which are absorbing. Connective tissues being laid

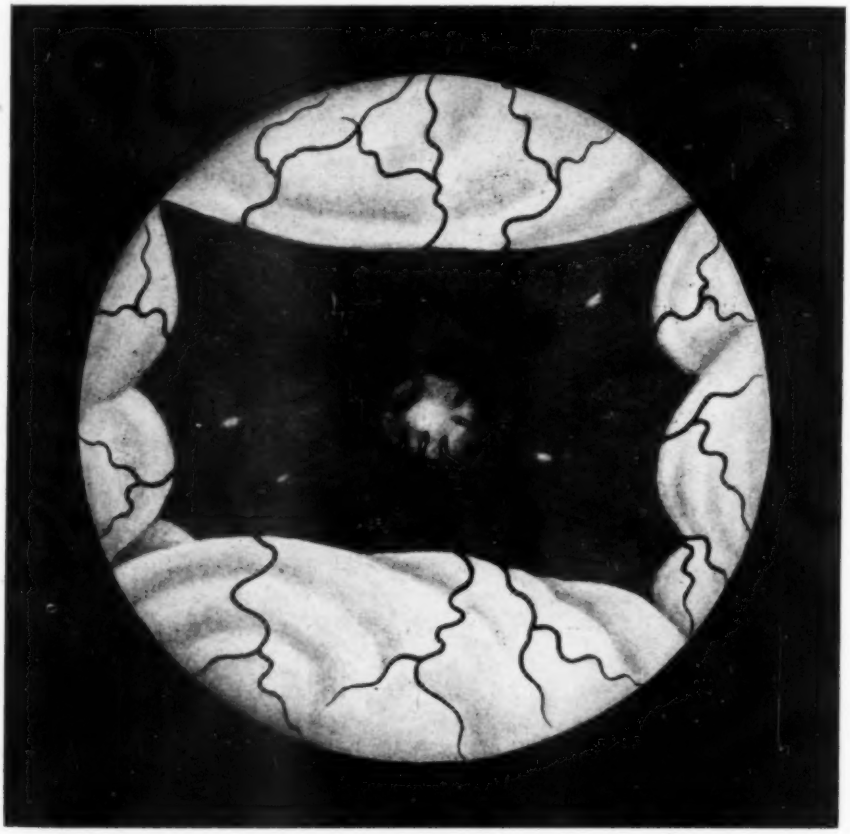

Fig. 3. Case III. Right eye. Retinal detachment encroaching from all sides, exudates and hemorrhages.

down about vessels still more prominent. Fields showed concentric contraction which would rather suggest beginning atrophy of optic nerves, altho their color was still good.

September 18, 1918, nerves had good color. All active conditions subsiding. Vision, R. = 20/70, L. = 20/30—.

still born child delivered on June 26.

June 27, 1918, eye examination. Pupils dilated and ophthalmoscope reveals almost complete detachment of each retina. Right eye shows (Fig. 3) a very large detachment extending horizontally across the lower part of fundus and upward to within about

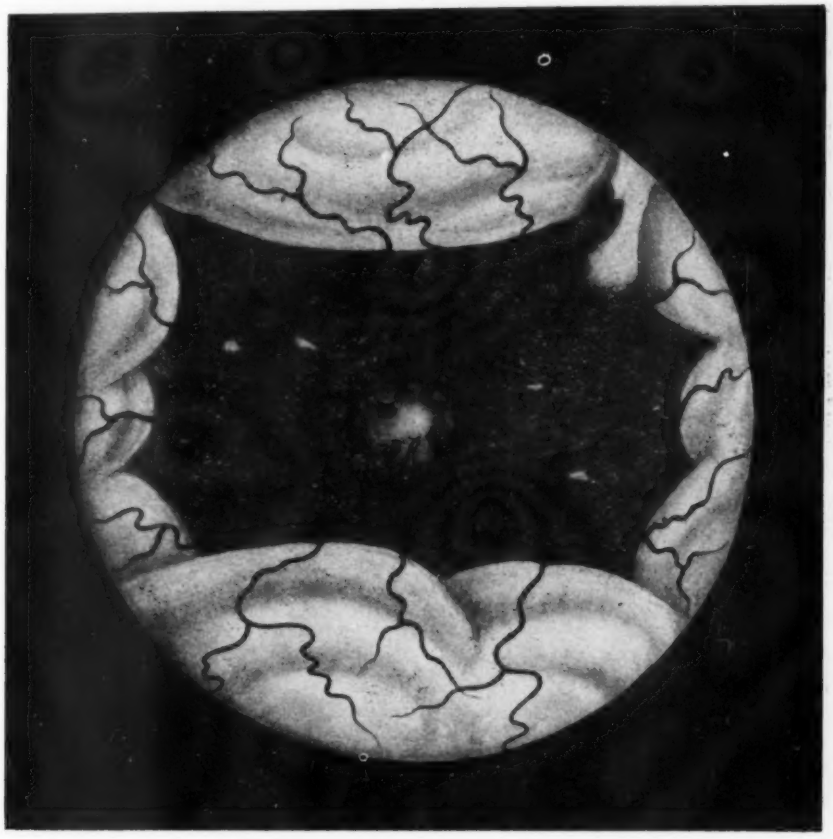

Fig. 4. Case III. Left eye resembling the right eye but with larger hemorrhages.

CASE III.—E. B., (colored), age 38. Entered hospital June 25, 1918.

Family and past history, negative.

Present history: This is a fourth pregnancy and everything appeared normal until two weeks ago, when vision began to fail. Patient walked into hospital and was put to bed. Blood pressure 270/160; urine showed albumin with hyalin and granular casts. Membranes were ruptured and one disc diameter of nerve head. There is another detachment above, which is not quite so large and these detachments are connected at each end by several smaller detachments, giving one the impression of looking down a cylinder. There is blurring of nerve outlines, with general edema of the retina, with few small exudates and hemorrhages. Left eye shows (Fig. 4) practically same condition except that the upper detachment seems to be

larger than the lower, and at the temporal extremity of the upper detachment there is a large exudate bordered by a hemorrhage

July 9, 1918, fundus reflex seen in all parts of fields, nerves still indistinct, considerable twisting of vessels with apparently some fluid under the retina

1918, at office, V. = O.D. 2/200, O.S. 20/100, no detachment visible. August 8, 1918, fields practically normal for form and no detachment can be seen, with undilated pupils. Both pupils dilated; still a well-marked neuroretinitis, but swelling of nerve heads subsiding and

Fig. 5. Case IV. Right eye. Edema of retina, small detachment, central exudate and hemorrhage near disc.

at the periphery, and numerous exudates about left nerve. Patient was treated by hot packs, salt solution, etc. Patient became delirious and violent and was taken home by relatives against physician's advice on July 9, 1918.

July 24, 1918, patient examined at home; mental condition good, claims to see *well*. Examination shows neuroretinitis, but no detachment. July 31, no detachment visible. V. = O.D. 20/200, O.S. 20/100.

CASE IV.—R. M. Aet. 26. November 15, 1918.

Family, personal and marital history unimportant.

Present history: Patient walked into hospital and examination showed nearly full term pregnancy with marked edema of face and abdomen. Patient complains of headache, dizziness and dark spots before eyes. Pa-

tient was restless and anxious; B. P. 170/92. Eliminative treatment inaugurated.

November 16, 1918, urine report shows albumin with hyalin casts. Patient very uncomfortable with nausea and vomiting. B. P. 195/120. Hot packs and eliminative treatment continued.

Chart notes in reference to eyes were as follows: 11-19-18, 4 p. m.: Both pupils normal in size. Fundi examined by direct method with undilated pupils gave impression at first that there was no lesion outside of slight edema of retina; but in looking in periphery of fundus in O.D. was discovered a whitish reflex which upon closer scrutiny proved to be a detachment. See Fig. 5.

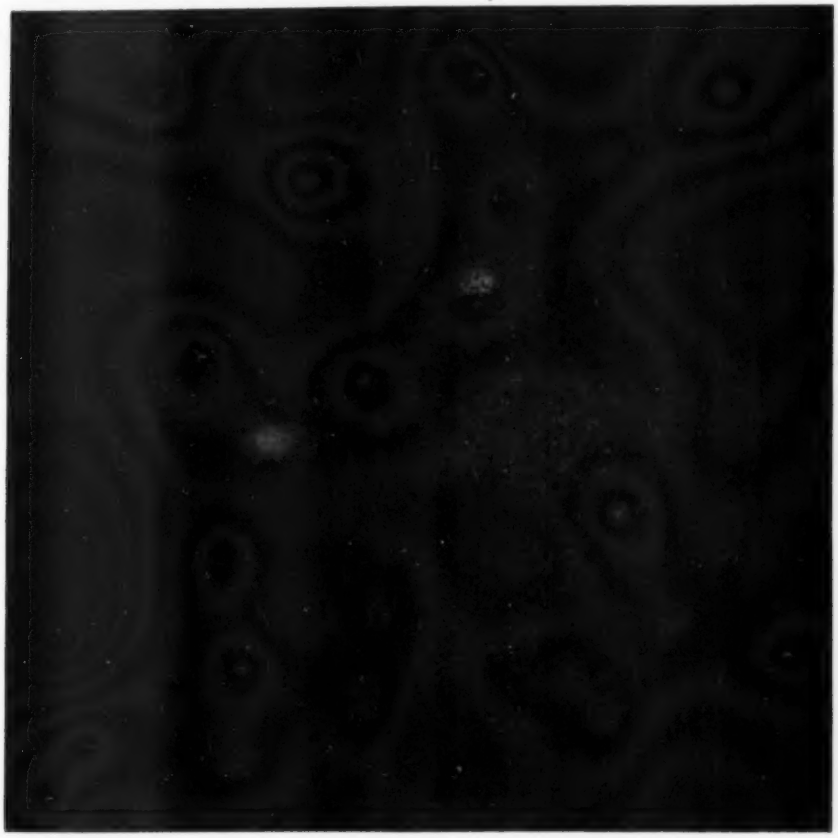

Fig. 6. Case IV. Left eye. Retinal edema, exudate and minute hemorrhages.

November 17, 1918, B. P. 170/120. Labor pains commenced at 4 p. m.

November 18, 1918, pains continued thru day with pronounced headache and nervousness, and blurring before eyes.

November 19, 1918, patient showed signs of exhaustion and child delivered instrumentally at 11 a. m. Patient was continued on eliminative treatment with clearing up of edema and albumin, being discharged in fair condition on December 2, 1918.

Pupils were then dilated with one drop of homatropin. Right eye shows practically entire obliteration of nerve outlines with general edema of retina. Just below and to nasal side was a small diffuse hemorrhage, while just above macula there was an area of infiltration through which the retinal reflex could be seen in places.

Retinal edema became more marked as one followed the superior temporal

vessels outward until some little distance beyond the macula, where was found a good sized detachment of the retina, the lower portion extending to the temporal equator having most fluid beneath the retina while the upper fold faded away to normal retinal level.

Left eye showed physiologic cup filled in and nerve borders indistinct, udates near macula. Upper outer quadrant shows no detachment of retina, but numerous small pigmented areas; no hemorrhage found. O.S. shows blurring of nerve, with thin exudate near macula, hemorrhages absorbing. Fields taken by Peter's campimeter show normal outlines.

12-1-18: Pupils dilated, no ophthal-

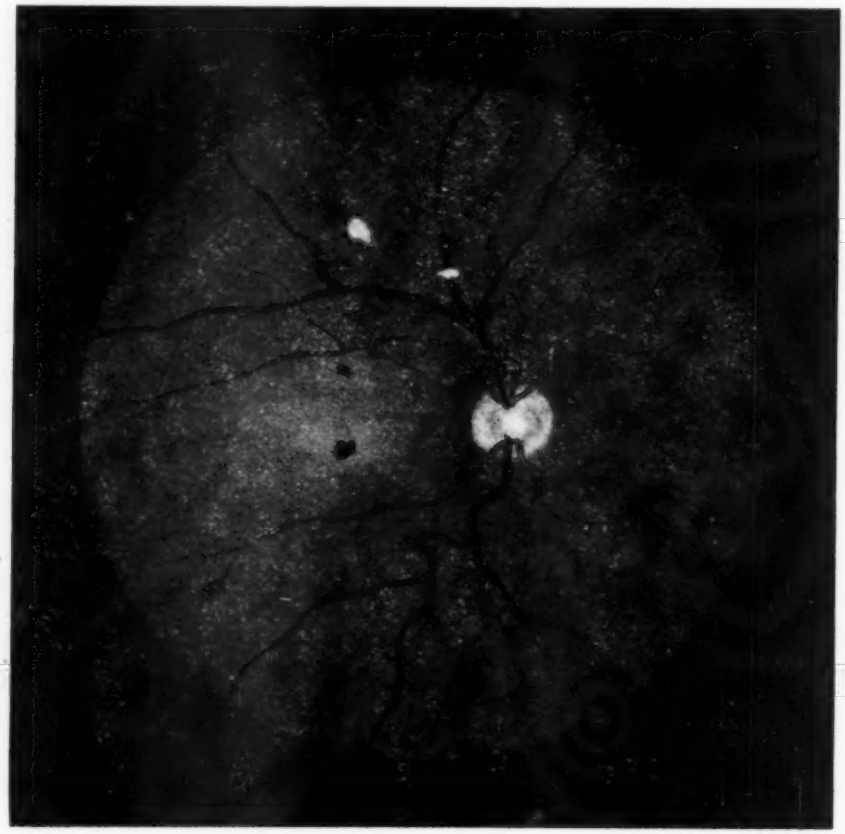

Fig. 7. Case V. Right eye. Retinal exudates and hemorrhages.

general retinal edema especially about nerve and macular region. Just above macula in close proximity to a vessel there is a thin exudate, while just above and to the temporal side are seen two small hemorrhages, the one nearest the nerve being a minute linear one, and the more distal one being several fine points. See Fig. 6.

11-28-18: Fundi examination with undilated pupils shows, O.D. blurring of optic nerve with two areas of thin exmoscopic change in findings from November 28, 1918.

CASE V.—Mrs. F., (white), age 40. Entered the hospital February 8, 1919.

Family history negative. Marital history, eleven children without previous trouble. Present history, entered the hospital with history that eyes had been getting blurred for five days, which condition had been growing worse.

Examination upon entrance showed

patient eight months pregnant, blood pressure 205/110 and presence of marked albumin, with red blood cells and hyalin casts in urine.

Eye examination 4 p. m. on February 8, with dilated pupils and direct examination showed blurring of right nerve head, vessels large and tortuous, with marked edema of the retina, especially about macula, and several exudates and hemorrhages; the exudates being most marked along the superior temporal vessels, while the hemorrhages were near macula and below. Lower temporal vessels seemingly raised and more tortuous than others. (See Fig. 7). Left eye showed same condition about nerve, with tortuosity of vessels and edema of the retina. There was rather a large exudate just above macula near vessel; no hemorrhages seen. About two nerve heads below disc, retina was detached, with typical white appearance, more on the order of a very large wrinkle than complete detachment, as slight pinkish reflex could be made out in the periphery. (See Fig. 8).

February 9, 1919. Eye examination, just after delivery of a male child, weight 5¼ lbs., no change could be noted. February 10, 1919, fundus examination showed no change in the right eye, but left eye showed an almost complete return of the retina to its bed, so much so that we were unable to demonstrate any detachment. Patient continued to show a neuroretinitis, with hemorrhages and exudates in right eye and exudates in left, until March 4, when she insisted upon leaving the hospital. Blood pressure was

Fig. 8. Case V. Left eye. Detachment below, exudates above.

then systolic 145, with a trace of albumin in the urine.

Case VI.—L. H., (white), age 33. Hopkins Maternity Ward.

History: Has had eight children, all living. Four weeks ago began to have swelling of limbs and was admitted to maternity ward on March 15, 1919, with edematous condition very marked. B. P. 205/110. Urine showed albumin and casts. Patient was delivered March 16, 1919, and this was followed by a couple of convulsions. Patient states she has had poor vision for two or three weeks.

Eye examination on March 19, at 5 p. m. showed pronounced blurring of outlines of right nerve, with retinal edema, vessels large and tortuous; as superior temporal vessels were followed outward there was noted increased tortuosity with definite elevation of retina measuring between 6 and 7 diopters. Pinkish reflex was present thruout this region, but definite wrinkling of retina was seen, several small exudates were noted in the edematous area about nerve and macula and one small hemorrhage near lower inferior nasal vessel. (See Fig. 9).

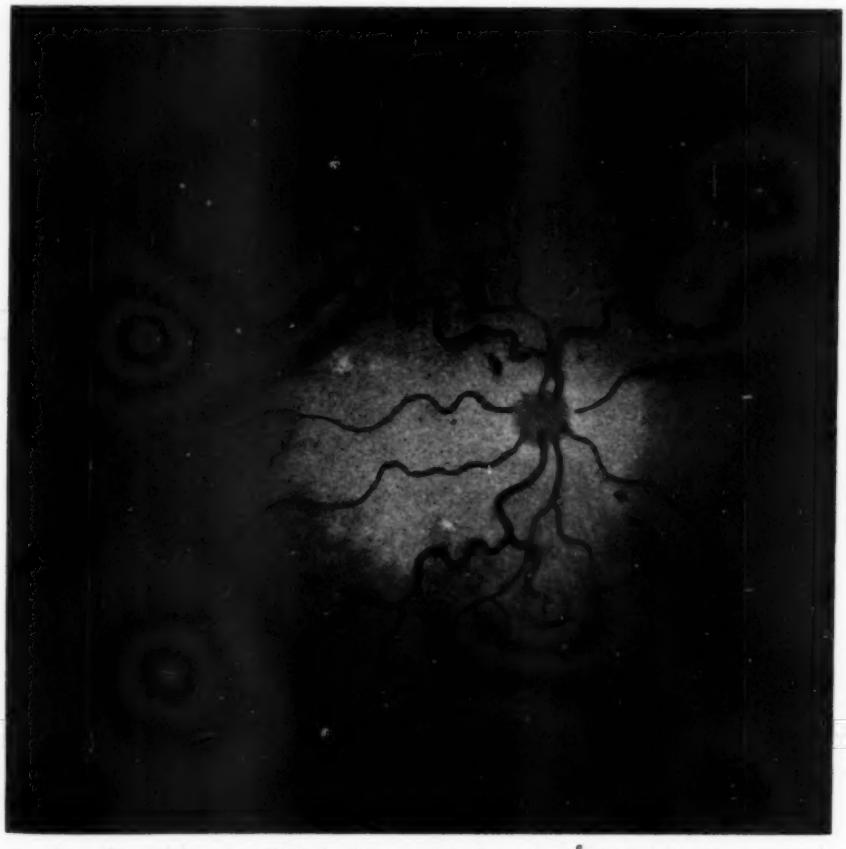

Fig. 9. Case VI. Right eye. Retinal edema, enlarged vessels, and fold of detachment up and out.

Left fundus showed same general condition as right, in the blurring of nerve head, retinal edema and small exudates and hemorrhages and tortuosity of vessels, but these were more pronounced just below and to the temporal side of the fundus, where wrinkling of the inner coat was found and where there was approximately the same elevation as in O. D., from 6 to 7 dameters. (See Fig. 10)

March 20, 1919, 3 p. m.: No change in fundi, with possible exception that elevation in O.D. may be less, patient says she sees much better.

March 22, 1919, no elevation of retina in either eye but neuroretinitis still present. Patient states she can see much better.

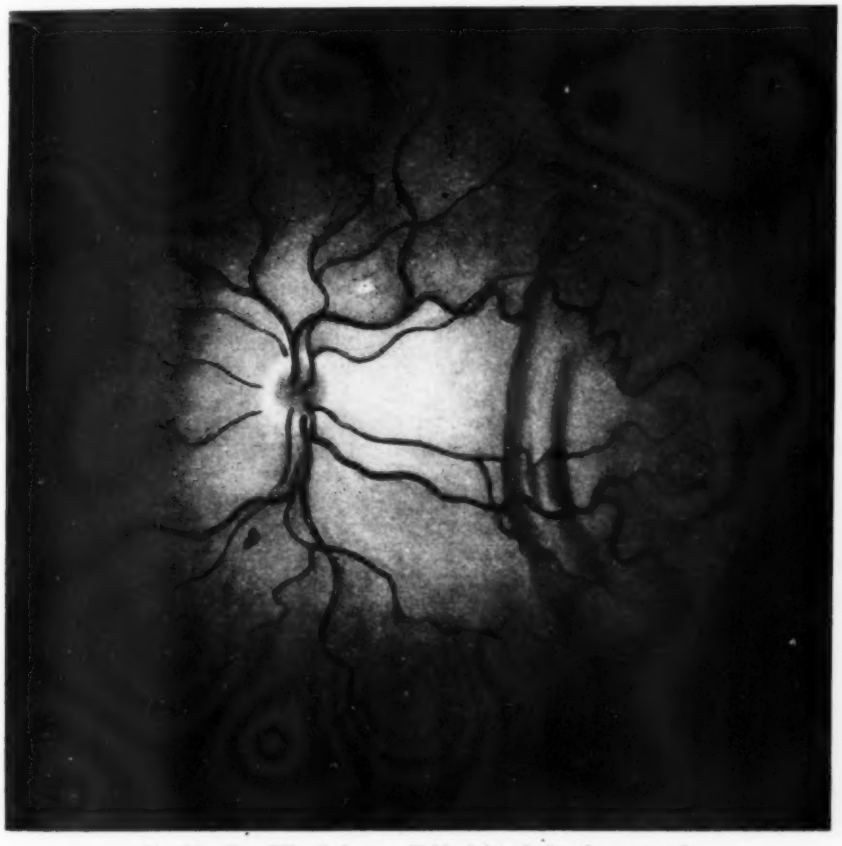

Fig. 10. Case VI. Left eye. Fold of detached retina outward.

April 8, 1919, both fundi show some neuritis, with edema of retina, exudates and hemorrhages.

REMARKS.

It is claimed by some obstetricians, that cases of toxemia or eclampsia which show eye changes, are always secondary to a kidney lesion.

To be sure detached retinas have been reported in cases of pure nephritis, as Jones[9] cites the case of a man having nephritis with double detachment in each eye, and Batten[10] double detachment in a boy having nephritis.

While one can easily see how in any case of inflammation of the inner coats of the eye associated with edema, one could most easily have this transudation poured out under the retina thus producing a detachment, its infrequency of record in this class of cases is not so easily explained. Many cases of eclampsia show edema of the retina extending from margins of nerve out towards the periphery, without either hemorrhages or exudates. These have been seen with increasing frequency since the introduction of the electric ophthalmoscope and using the direct method of ophthalmoscopy, especially so in those toxemia cases where unconsciousness of patient makes it often exceedingly difficult to make a thoro examination.

Some are now claiming that the unconsciousness is due to cerebral edema, and one can readily see how an edema of the retina starting most frequently with a slight blurring of the optic nerve and extending peripherally could be associated with cerebral edema, and it requires only to carry this pathologic phase one or two steps further to conceive this accumulation in such quantities as to cause separation of the retina from its bed, taking place most frequently in the lower part of fundus first, and then if the condition is not arrested continuing the separation around the entire circumference. When this stage arrives it would be logical to expect that both serum and blood would find their way outside of the vessels and lymphatics, producing exudates and hemorrhages. So much for our hypothesis, now how is it borne out by facts in our cases under observation? In the first case at the first examination, the patient was in profound stupor but the pupils were dilated and both fundi examined by direct method with result as described. Two days later imagine our surprise in finding such a change with double detachment in the right eye and a very large single one below in the left.

Baehr[11] asserts that both coma and convulsions are usually if not always due to cerebral edema either general or localized, and whether this occurs as a result of trauma or from influence of toxins the end results are similar. One is struck by the similarity of fundal pictures as seen in most cases of toxemia of pregnancy with its slightly blurred nerve head and retinal edema and those cases of fractured skull where the eye findings are usually of like degree in blurring of nerve head and edema of retina.

Wilson[12] and Snyder[13] report cases of eclampsia that ceased having convulsions as soon as lumbar puncture was performed, while Zangemeister[14] devotes fifty pages to arguments sustaining the contention that the clinical symptoms (convulsions) are due to intracranial edema.

The mechanism of detachment of the retina as contended by Leber[15] and Nordenson, a fibrillary change in the vitreous, does not seem in these cases to be at all apropos, but it seems more on the order of Raehlman's[16] theory of diffusion.

The first case will not bear out the contention that ophthalmoscopic changes never occur in eclampsia for a case having sixteen typical convulsions would certainly be classified as eclampsia; nor would any of these cases substantiate the theory of excessive congestion except the possibility of case IV. as cases II. and V. occurred before parturition and cases I., III. and VI. were not difficult.

Diagnosis: While the condition as it existed in these cases was very definite and if seen could not have been mistaken by even a novice, I am of the decided opinion that many more cases of detachment occur in eclampsia than are reported and that these occur far in the periphery and are frequently overlooked. Another point which certainly should be kept in mind is a rather frequent examination of these cases, and always with a widely dilated pupil. This is strikingly illustrated in cases I. and V., as the initial examination in case I. was not startling, but a few days later the appearance was far from reassuring and in case V. if examination had been deferred, as frequently happens, no detachment could have been found. Then again let me plead for a very careful paistaking examination, as cases I. and III. were very difficult of examination with the ophthalmoscope, and as the fundi were studied only after some effort; and case IV. was only discovered after careful searching of the periphery. One must also keep in mind the flat detachments as seen in case VI., where definite elevation and wrinkling were found but where the fundus reflex is not lost. It is quite probable that this case had typical detachments and was in the receding stage when first examined.

Prognosis: Altho the appearance is disheartening, and one is likely to give a very grave prognosis as one becomes accustomed to do in idiopathic detachments, here the prognosis de-

pends not so much upon the amount of detachment, but upon the accompanying neuroretinitis as well as upon the length of time that this has existed. The prognosis in reference to the detachment is exceptionally good as evidenced in this report, and also of cases cited, but as to ultimate vision it must of necessity be guarded as the neuroretinitis is often followed by marked permanent impairment of functioning retina.

Treatment: Altho eliminating treatment is essential after the condition is well marked, the most important treatment is prophylactic. In this age of modern medicine when blurring of vision occurs in any stage of pregnancy, and especially in the latter months, there should be a most careful and painstaking fundal examination, and in cases where there is found neuroretinitis, either with or without detachments, certainly from an ophthalmologic standpoint, premature delivery is justified.

While none of this series was treated by spinal puncture, I feel certain that repeated spinal puncture is a procedure that is at least worthy of trial.

As to local treatment I am inclined to the belief that negative is as valuable as positive treatment, and that nearly the entire result depends upon active elimination as outlined by the attending obstetrician. Case I. had active local treatment in the form of pressure, bandage, recumbent position, etc., but one could see no more marked improvement than in cases II., III., IV., V. and VI., where little or no local treatment was used. To be sure cases II., III. and V. did not have such good end results, but that occurred as a result of the neuroretinitis, which was of longer duration with more extensive scarring of retinal and nerve tissue, while case IV. I am sure had good end results, altho I was never able to get her to return to check up the vision, and case VI. is still in the hospital.

Summary: Retinal detachment in eclampsia is, according to most authors, a very rare condition and conspicuous by a paucity of literature. Six such cases have been under our observation since December, 1917, varying in extent from small to almost complete detachment of the retina. In contradistinction to so-called iodiopathic detachments, these have all subsided and become reattached with normal fields of vision.

They may be antepartum or postpartum, and may clear up in a few hours, and are frequently far forward in the periphery and found only after some searching. They are probably present much more frequently than heretofore recorded, and the prognosis is good so far as the detachment is concerned.

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CONJUNCTIVITIS DUE TO FOOD ANAPHYLAXIS.

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This paper calls attention to an unusual condition of extreme interest and some practical importance, and reports three cases.

It has long been known that certain foods, when eaten by individuals peculiarly sensitive or anaphylactic to these foods, develop certain symptoms or ill effects. Among the better known disturbances are urticaria, eczema, vasomotor rhinitis, angioneurotic edema, and bronchial asthma.

I shall produce evidence to show that conjunctivitis unaccompanied by any other manifestation may also be produced by the proteins of commonly used foods which up-to-date have not been recognized as causes of this disease. My attention was called to this possibility by stubborn inflammations of the conjunctiva recurring in the same patient at or about the same time year after year. Most of these cases had been treated for a considerable period of time before I saw them but had never had any treatment that permanently relieved or shortened the attacks. For a time the determination of the offending food was by either guess work or elimination. When the food happened to be a fruit or a vegetable which was eaten only at certain times of the year the diagnosis was comparatively easy. For a number of years I have seen cases in which I considered certain foods as possible causes of this recurring conjunctivitis, but owing to lack of coöperation and careful observation on the part of the patients I was not definitely convinced that such was the fact.

In the summer of 1915 I was very fortunate in having for a patient a young man who was not only intelligent and observing but who was willing to carry out any and all suggestions I proposed. For five or six years he had suffered from "sore eyes," which generally began in May and continued off and on till late in the fall. When I first saw him his lids appeared somewhat reddened and swollen, with a suggestion of a slight ptosis such as one sees in trachoma. The bulbar conjunctiva was markedly hyperemic, with a more moderate hyperemia of the palpebral conjunctiva. During the following two years he definitely proved to me and himself that his conjunctivitis was due to eating either strawberries or tomatoes. The patient was convinced long before I was. He would report in the afternoon with a conjunctiva that appeared normal, then eat freely of tomatoes or strawberries and return the following day with the usual "sore eyes."

During the time he has been under observation he has never had his "red eyes" except after eating one of the offending foods, nor has the eating of these foods ever failed to cause a hyperemia of the conjunctiva. Last fall this patient reported again, saying that some new food was causing a recurrence of his old trouble. The protein skin tests showed no new sensitization. I did find, however, that he had indulged in a catsup which contained tomatoes. We then found that this, when eaten on baked beans, always brought on a marked conjunctival hyperemia.

The protein skin test is the one used by Walker[1] in his investigations of the cause of bronchial asthma. The proteins used are prepared by Wodehouse[2], who in 1916 described the preparation and method of manufacture. The skin test is made as follows:

"A number of small cuts, each about an eighth of an inch long, are made on the flexor surface of the forearm. These cuts are made with a sharp scalpel, but are not deep enough to draw blood, although they do penetrate the skin. On each cut is placed a protein and to it is added a drop of tenth normal sodium hydroxid solution to dissolve the protein and permit

of its rapid absorption. At the end of a half hour the proteins are washed off and the reactions are noted, always comparing the inoculated cuts with normal controls on which no protein was placed. A positive reaction consists of a raised white elevation or urticarial wheal surrounding the cut. The smallest reaction called positive must measure 0.5 cm. in diameter."

The use of the skin test makes the diagnosis comparatively easy and cases are now found that ordinarily would escape detection. The majority of these cases are of moderate conjunctival injection and generally the patient's only complaint is as to the appearance of his eyes.

These patients may, however, present very annoying eye symptoms, as the following case will show.

A. B. R., 56 years, male, merchant. For the past four or five years he has been unable to read for more than five minutes at a time without, as he expresses it, "a feeling of sand in his eyes, the lids feel constantly as they do when one is very sleepy." He has rather frequent, sudden attacks of lacrimation, which come on without any known cause and stop as suddenly as they started. He says that he has had a perfectly miserable time of it for the past couple of years, with practically constant eye discomfort; so he became an "early to bed and late to rise" sort of a fellow, as the only time he was at all comfortable was when his eyes were closed. His glasses had been changed a number of times, tinted lenses had been ordered and worn, drops of various kinds and colors had been prescribed and used without any benefit whatsoever. The eye lids were slightly swollen and congested and there was a general enlargement of the conjunctival blood vessels which was more marked on the bulbar conjunctiva. Nothing found in nose or throat. General condition good. No bad habits, did not smoke or drink, and I could not find any change necessary in his glasses. The elimination of eggs from his diet was shortly followed by a total disappearance of his annoying symptoms. For the past two years he has been able to use his eyes as he wished, and he informs me that life is once more worth living. One control test followed by a return of his symptoms was all I could persuade this patient to make.

On a recent skin test with some thirty odd proteins this patient reacted to egg alone. This case is of additional interest in that as a child he suffered for eight or nine years from asthma and then later in life from hay fever. It may be that as a child he had a bronchial asthma from some food protein, outgrew this sensitization, and then became sensitized to rag weed or timothy pollen, to which in time he also became antianaphylactic, only to develop a few years ago a sensitization to egg protein.

The skin test should be made at the time the patient is suffering from the conjunctivitis, as in some people the anaphylactic reaction disappears after the patient abstains from the offending food any length of time, to reappear again on eating it.

In other cases one finds a positive reaction where the patient has eaten the offending food but once or twice during his whole life.

Talbot[3] has found infants who have never tasted egg, but who gave a positive skin reaction to egg.

In a number of cases the tendency to protein sensitization seems to be hereditary, as frequently the patient will volunteer the information that other members of his immediate family are subject to annoying and, at times, alarming symptoms after eating a special food.

People are frequently found who react to two or more of a group of closely related proteins, while in others the reaction is to one specified protein, as the following case illustrates.

CASE 3.—A. H., 28 years. Male. For the past five years this man has suffered from an inflammation of the right upper lid which always occurred during or immediately following his summer vacation. While away he spent most of his time fishing for flounders, which he ate two or three times a day. During the remainder of the year he

ate very little fish and never any flounders. Not being able to obtain flounder protein, at the suggestion of Wodehouse I tried sole protein, as sole is a sort of first cousin to flounder, but obtained no results. Thinking that possibly too long a time had elapsed since the ingestion of this fish, two months later I requested the patient to eat flounder a few times so that I could again try the skin test. On the day following a two-meal test the lid inflammation recurred, but the sole protein test remained negative. I now prepared a home-made protein, and with this obtained a positive reaction.

In the absence of uncorrected ametropia, all recurring low grade inflammation of the conjunctiva which the patient calls "frequent attacks of red eyes," should be considered as possibly due to food anaphylaxis. This is especially true when the attacks appear the same month year after year. After obtaining a positive skin test the proof as to this food being the cause of the conjunctivitis is very readily obtained by the patient.

I believe that a number of diseases whose etiology is now grouped under the indefinite head of autointoxication will be found on closer examination to be anaphylactic phenomena.

In conclusion I will add that I also believe that the study of food protein anaphylaxis and bacterial protein anaphylaxis will explain the etiology of a number of eye diseases, especially keratitis and low grade inflammation of the uveal tract, and open up vast and fruitful fields for investigation.

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OCULAR LESIONS CONSECUTIVE TO INJECTIONS OF ANTITYPHOID VACCINE, KERATITIS HERPETICA FEBRILIS.

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This paper reports a case of ocular lesions following antityphoid vaccination, and reviews the previously reported cases, and the conclusions that have been drawn from them.

The scientific periodicals have been publishing for one year and a half a series of very interesting articles about the ocular lesions resulting in a small number of persons inoculated with antityphoid vaccine. We add a case in which were observed some points which have been previously noted and published.

Our patient, a German of 52, a bookkeeper by occupation, has resided in Guatemala since his 20th year. He has no pathologic record nor antecedents of any importance. He acclimated himself easily to the tropics, and has always lived in the city (1,500 meters altitude). Three years ago, being on a vacation in New Orleans, he had a herpetic keratitis, following catarrh of the upper air passages, for which he had consulted us on his return; and we could retrospectively trace the picture of the disease by dimness of vision, photophobia, lacrimation, conjunctival and ciliary injection, anesthesia, and dendriform ulceration of the cornea, miosis and hypotension, without pain or elevation of temperature, and no lesions of the face. A general examination was made, but the keratitis could not be attributed to any other cause than the catarrh of the upper air passages which preceded it. Under proper treatment it yielded in due time, leaving a thin, superficial opacity on the anterior part of the cor-

nea, which disappeared completely. Final vision result = 9/10.

During the three years that have elapsed from that time, the eye had been quiet until the 15th of May of the current year. On the evening of the 13th he received a third dose of 1 cc. of Mulford's "Typho-Bacterin Mixed," which contains per cc.:

1,000 millions of dead typhoid bacilli
500 millions of dead paratyphoid A. bacilli
500 millions of dead paratyphoid B. bacilli.

This injection was given on Monday at 6 P. M., and from midnight and all Tuesday he had a fever (39,6°C.), headaches, boneaches and general malaise. In the evening the pain decreased, the temperature fell and a cluster of nasolabial herpes appeared on the right half of the face. On Wednesday, he awakened with an inflamed, red, right eye, photophobia, constant lacrimation and blurred vision.

He consulted a physician immediately, who prescribed a solution of nitrat of silver; but remembering having previously had something similar, in which we had assisted him, he consulted us on Sunday, the 19th.

On that date the picture was the following: Right eye; diminution of visual acuity, photophobia, lacrimation, constant sensation of a foreign body, strong conjunctival and ciliary injection, two central, branching, superficial ulcerations of the cornea. Pupil sluggish and contracted, anesthesia of the cornea. Tension: diminished. In the nasolabial region of the right side I found dried herpetic particles. The teeth, gums, tonsils, nasal fossae and sinuses were healthy, and no area of focal infections was found. The point of injection did not present the least sign of infection.

We thought immediately of a herpes febrilis of the cornea, consecutive to an injection of polyvalent antityphoid vaccine, developed in a subject whose examination did not reveal other causes, but who had among antecedents a previous appearance of catarrhal herpes on the cornea, and to this anteceding lesion we attribute a great importance on which we will report later.

Morax[1] was the first who gave the alarm, publishing a case in whom, after a febrile access caused by an injection of T. A. B., a keratitis herpetica developed, which was of slight importance, since the patient recovered vision completely.

Gloagen,[2] chief of the ophthalmologic clinic of the Maritime Hospital of Cherbourg, records three other cases of keratitis herpetica. In the first case the third injection produced fever of 40° C., headaches, boneaches, which induced the physician to make a lumbar puncture on the following day. That same day an intense nasolabial herpes broke out. Three days later there appeared in the right eye a classic herpetic keratitis and the fluorescein showed the fine ramifications. The affection was cured in eighteen days, but a thin opacity of the cornea persisted which reduced the vision to 0.6.

In the second case the fourth injection was followed by general malaise, headaches, fever (40° C.). After the following day, nasolabial herpes appeared. Three days later, besides a dense palpebral herpes of the upper lid, a typical herpetic keratitis which affected almost all of the cornea, was observed. Cure in 25 days, but an opacity persisted which reduced the vision to 0.1.

These observations relate to herpes febrilis of the cornea. It is very difficult to judge them if they are not submitted to an impartial analysis, owing to the intimate relation which seems to exist between the cause and the effect. An incorrect interpretation would be extremely detrimental to a new prophylactic method which is expected to give incalculable service to humanity. We shall endeavor to interpret these observations for which we need to note other ocular affections which have occurred immediately after vaccination.

The febrile form is one variety of herpes of the cornea. It shows itself in the infectious diseases, accompanied by vesicular eruptions of the skin of

the face and of certain mucous membranes; and is considered a toxic neuritis of the trigeminus, the herpetic keratitis being a neuritis of the terminal filaments of the ciliary nerves.

All the observations are identical. One of the inoculations is followed by a febrile access, after which herpes appeared upon the skin of the face and the mucosa, followed by appearance of herpes on the cornea. The injection of T. A. B. is the cause of the fever, and the herpetic appearance. Let us note immediately that this latter is rather exceptional, considering the great number of vaccinations which are made.

We might suppose that the cause of the fever is a microbe, which has developed in a badly prepared or poorly preserved vaccine. We also presume that the microbes can find entrance into the organism by a faulty technic. One can imagine that a febrile access acts by reviving a latent infectious focus, preexisting in some part of the body. However, the microbes secrete toxins which affect certain nerves; or one could finally explain the process, by the action of a proteid substance which developed in the vaccine, and has the property of producing fever and irritation of the trigeminus.

The accepted opinion is that the antityphoid vaccine by itself can be the direct cause of the herpes of the cornea, it not being possible to find another cause. The observation that we present is very interesting because it treats of recurrence and our patient is therefore a subject predisposed to the nervous lesion, which presented itself before in an identical form, without the vaccine having to figure in the etiology of the process. The first time, a catarrh of the upper air passages preceded the lesions of the eye; and now it appears after a reaction of T. A. B., which brings us to the following conclusions: It has been supposed that the febrile herpes of the cornea directly depends upon the antityphoid vaccine; but our observation modifies this opinion because in our patient a predisposition existed.

Prof. de Lapersonne[3] published a case, a résumé of which we reproduce herewith. A soldier, after the second or third injection had multiple abscesses and infectious broncho-pneumonia; and in the course of this pulmonary complication, presented a unilateral metastatic ophthalmia. After such grave general complications he recovered with an atrophied and painful eye, which it was necessary to enucleate some days later. De Lapersonne thinks that the microbes of the infection, introduced into the organism with the vaccine, were the cause of that pyemia; but not the vaccine which does not contain infectious germs.

He considered this case extremely rare, but he thinks it should be known, so that in the future one may avoid similar cases by strictly following the rules of asepsis; and he advises that the patients be rigorously examined before vaccinating them, because latent infectious foci can be revived; and the visual organs must be especially examined by an oculist. Besides an infection, a recurrence of an iridocyclitis can happen. Avoid them in people who are predisposed thru a persisting pathologic state. In this manner one can conceive that in the luetic, rheumatic, tubercular, or in anyone who may have had a generalized gonococcic infection, etc., ocular lesions can appear when a violent reaction happens.

Calhoun[4] published two observations in an article entitled "Anti-Typhoid Inoculations and Ocular Lesions." The first observation was in a lawyer with a slightly positive Neisser reaction, who presented a typical iritis the day following an injection of T. A. B. The other case was in a luetic with a + + + positive Wassermann. Three days after the third injection the vision blurred and the examination showed several deposits on the posterior wall of the cornea, opacity of the vitreous, and two patches of acute choroiditis. Salvarsan, mercury and iodides made the lesions disappear.

Prélat,[5] who published a case similar to the second of Calhoun, thinks it very questionable if the vaccine has a predisposing action. There are reasons why, in such a patient a plastic luetic

iridocyclitis may develop, without it being necessary to resort to the antityphoid injection to explain genesis. Indeed, the luetic origin of double iridocyclitis not only seems to be possible, but certain, the antecedents, the clinical signs, the Wassermann, the favorable result that the treatment gave are positive proofs. It nullifies the hypothesis of direct action of the vaccine, but suggests that this may have played a coöperative part. On the other hand I find it very fair to bring to notice that, with the number of vaccinations which are given, it must be possible to meet one with some recurrences.

From his observations he finally deduces the following conclusions:

(1) The antityphoid vaccine in the luetic subject safe from any complications, does not seem to have any danger. If in these conditions some complications arise, it is not possible to make the injections responsible for the lesions. On the contrary, he considers it prudent, as de Lapersonne advises, to abstain from that practice in luetic and tubercular subjects, etc., who may have had lesions of the uveal tract, because they can be revived under the influence of the vaccine.

(2) Owing to the medico-legal consequences that might arise, in similar cases, the accidents that present themselves after the injections of T. A. B. must not be attributed to the vaccine until after a complete and minute examination of the patient; and it is not possible to accept this etiology without great circumspection and after a satisfactory verification. The observation of that patient is a proof of the necessity to judge such facts with extreme prudence.

The observations of Etienne Ginestous[6] belong to a circle of simple and tedious coincidences, because in the traumatism of an ocular globe, even in a very grave case like that which is the object of the first observation, it is usual to observe in practice momentary improvements, followed by rapid reactions which threaten the vision, or even produce amaurosis. This should not surprise us, nor do we find this case exceptional. It concerns a shoemaker 19 years of age who, while playing, received a heavy blow on the right eye and lost the vision instantly. But on the following days he presented certain improvements even to the point of recovering one-fourth of his vision. On a day following an injection of T. A. B. he lost the sight again and he did not recover. Traumatic neuritis developed, nearing atrophy, an ordinary process in which it is not possible to account for direct influence of the vaccine.

The second case of the same author concerns a myope, with posterior staphyloma and chorioretinitis, vision with a $-5 = 2/3$. After a third injection, which caused fever and diarrhea, he noticed that his vision diminished to 1/6, after correction. We remember that the lesions of the retina of the myope can progress and the visual acuity diminish, even after the defect was corrected; and that at a certain moment, without the apparent determinating cause, a rapid diminution of vision occur. One must consider the immense number of myopes inoculated with T. A. B., and none of them complaining of poor vision after vaccination, and we also note that many myopes, without receiving any inoculations, suffer diminution of vision.

Other troubles have been observed, such as lesions of the retina (Morax), ocular motor nerve paralysis (Morax and Bourdier), whose etiology is most questionable, as it concerns luetics or patients whose luetic records have not been investigated. Morax himself admits that it is a question of coincidences, such as happens in the two observations of Ginestous. In résumé: It is a question of late consequences, of known processes which in their evolution do not diverge at all from the usual, and therefore do not seem influenced at all by the antityphoid vaccine.

So far there have not been published any cases of retrobulbar neuritis. De Lapersonne would explain them by a meningeal reaction of the sheath of the optic nerve. Of the same nature would be the lesions of the optic tracts and also those of the motor nerves.

He advises extreme prudence and really admits the action of the vaccine only in those cases in which the different clinical and laboratory examinations, and very particularly the reaction of Wassermann, have been negative.

It is necessary to differentiate the glaucomas. Is it a question of glaucoma secondary to old irido-cyclitis, with pupillar occlusion? Nothing is more easy than to think of an acute attack developed during a violent reaction.

The explanation of the acute and subacute glaucoma is much more embarrassing; and it would be really difficult in this case to deny the influence of the vaccine or to explain the process of a chronic glaucoma whose pathology is far from being clear, the manner in which the vaccine could aggravate it is not evident, above all when the aggravation is late, more than one month, and a febrile access did not follow the injections.

So far our knowledge of ocular lesions consecutive to injections of antityphoid vaccine is limited; but as conclusions one could establish the following propositions, which, with some exceptions, are the views of the majority of the authors referred to.

1. There exists no ocular lesion depending directly and exclusively upon the antityphoid vaccine.

2. Herpes febrilis of the cornea is the ocular lesion which is admittedly dependent upon antityphoid vaccine; but in certain cases, as in our observation, it dealt with a recurrence, and one must admit a predisposition.

3. In a like manner, the cases of iridocyclitis which have a constitutional defect must be considered. A reaction of the vaccine can bring on secondary glaucoma depending upon iridocyclitis.

4. Pyemia, whose cause is a fault of asepsis in the technic, can produce grave complications of metastatic purulent iridocyclitis.

5. Certain lesions of the optic nerves, the optic tracts and certain ocular paralyses, of which, so far, no observations have been published, could be explained by meningeal reaction.

6. An acute primary glaucoma can develop during the reaction of the vaccine. It is not possible scientifically to express in what manner a chronic glaucoma would be aggravated.

7. To admit the action of the vaccine, it is necessary that the ocular manifestations should present themselves during the febrile reaction or immediately after.

8. In certain cases it is not possible to attribute to the vaccine any action at all, it is simply a question of annoying coincidences.

9. It is not prudent to vaccinate luetic, tubercular, and rheumatic subjects, etc., who may have previously had lesions of the uveal tract.

10. There is no reason to deprive those subjects of the benefits of the vaccine who had no former lesions of the uveal tract; who are exempt, therefore, from all former ocular affections.

11. The patient must be submitted to a previous medical examination, and the examination of the eyes entrusted to an oculist.

12. Before judging on a medico-legal matter, due to the vaccine, it is necessary to use great circumspection and to have a perfect knowledge of all that has been said on the subject.

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THE EFFECTS OF FAULTY CRANIO-SPINAL FORM AND ALIGNMENT UPON THE EYES.

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Faulty posture of the head and spinal curvature are generally recognized as effects of ocular anomalies. This paper points out the reverse relation may be true, and the ocular symptoms relieved by orthopedic treatment.

Tilting of the head, high-headedness and its converse have long been recognized as products of, or have been found in such constant relation to the various heterophorias and heterotropias, notably the cyclophorias, as to fix the opinion that the cause of the ocular misplacements and torsion, and consequently of the cranial malposition, was primarily a fault of action of the extrinsic ocular muscles and particularly of the obliques.

Spectacular cures of marked torticollis, effected by operating upon these muscles in a few cases, further so emphasized this opinion, that the possibility of faulty cranial posture, as a primary result of marked cranial asymmetry, or secondary to faults of spinal alignment or of actual vertebral lesions, acting to produce ocular torsion and changed corneal curvature thru compensatory overaction of certain groups of extrinsic ocular muscles in their effort to achieve and maintain normal spatial orientation, apparently never were considered.

Prior to the inception of our work in August 1915, ophthalmic and orthopedic literatures were barren of facts dealing with such an association. In fact the ophthalmologist limited his notions of ocular mechanics to the orbit, while the orthopedist rarely went above the seventh cervical vertebra, from which point he usually dropped a plumb line in spinal examinations.

Our interest in this problem arose from having seen projectile wounds of the cervico-dorsal spine with frank ocular symptoms; from a case of acute glaucoma in which the first symptom, acute cutting pain in the cervico-dorsal region, was so agonizing as to mask the ocular lesion, or symptom, temporarily; from observing that obvious and gross skeletal deformity seemed more prevalent among cases of manifest squint than among ordinary eye cases and, finally, from noting that the sub-occipital and nuchal aching which accompanied many of the more marked refractive and muscular faults very often did not yield to the most accurately prescribed lenses or to muscle training, but were often temporarily relieved by cervical massage or manipulation.

A chance-discussion of some of these facts with Dr. Charles L. Lowman, a capable orthopedic surgeon, revealed the fact that he had noted improvement or relief of eye symptoms in patients coming to him for such remote static lesions as flat foot, hip disease and, more frequently, cervico-dorsal lesions. "Pulling," "drawing" or "burning" sensations in the neck and back were common complaints among the last class, and were more pronounced during or after sewing, reading, writing, typing or watching moving-pictures, activities which require stabilization of the head, or shoulder-girdle fixation (essential to the use of the hands in any finely coordinated work) or both, as an essential to intense ocular fixation, thus putting strain on all the muscular and ligamentous attachments and structures involved in maintaining head balance and in fixing the shoulder-girdle.

We knew that only about ten per cent of all individuals could be classed, posturally, as belonging to the "ideally normal type." It was estimated that emmetropia and normal muscle balance existed in about an equal per cent of individuals and the parallelism seemed suggestive. Further, lateral and antero-posterior deformities of the spine are very common, anatomic pecu-

liarities are frequent in the cervical region and cranial asymmetry is the rule.

It seemed logical to assume, therefore, that not only could spinal curves and rotations be evolved compensatorily in the mechanics of balancing unequally weighted cranial halves upon the spine, but also that faults of cranial posture, such as tilting and high-headedness, could be the compensatory postural result of spinal bends and torsions due to unilateral leg deformities and faults in pelvic alignment, as well as to original lesions of the spine. We assumed, further, that the eyes could be involved in these skeletal defects; first thru reflex irritation, stretching or pressure upon the cilio-spinal sympathetic center and pathways, a relation to be detailed in a subsequent paper (American Encyclopedia of Ophthalmology, Vol. XV, *Spinal Affections*); and secondly thru compensatory action of the extrinsic ocular muscles producing compensatory heterophorias and heterotropias and presumably changing the corneal curvature by their novel and unequal efforts to put and to keep the world right side up.

We believed it logical to hold that certain ocular muscles might become shortened by adaptation, in the same manner that the peronei in the leg shorten when the internal muscles stretch and let down under the increase weight caused by a disturbed line of gravity and that there was no reason why a tilted pelvis, for instance, should not produce compensatory changes in the eye structures as it will in foot structures.

On these assumptions several hundred consecutive eye cases were contrasted with the consecutive cases of postural defects appearing at the Crippled Children's Guild. In the former group, naturally, nothing like a full orthopedic examination, with the patient stripped, was possible. At first merely the binocular and monocular ductions were taken, together with the usual refractive findings, but later the fixing eye for distance and near was determined, the ocular torsions, the gross features of cranial and facial asymmetry were observed, as well as the location of a plumb line passing thru the external occipital protuberance and the position and degree of head-tilting, rotations and other cranial malpositions.

It was quickly found that among the cases which were without doubt primarily orthopedic, such as infantile paralysis, hip disease, tubercular disease of the spine etc., gross ocular muscle defects and irregular astigmatism, of notable degree, occurred in the proportion of about 3.2:1, when compared with the consecutive eye cases, the comparable cases among which, almost without exception were frankly out of skeletal alignment. A standard of over 3 degrees of left or right hyperphoria, of over 3 degrees of exophoria or esophoria, exophoria for near of 10 or more degrees and esophoria for near of any degree were taken as an empirical but practical basis for comparison. Left hyperphoria occurred in 72 per cent of the orthopedic cases and 61.5 per cent of the eye cases; and the characteristic ocular imbalance associated with the obvious postural imbalance was that of left hyperphoria; exophoria for distance and increased exophoria for near, due to weakness of the left internus, the right eye fixing both for distance and near, the left diverging at near, and the left eye showing torsion or cyclophoria. In the eye group it was seen that the great majority of patients complaining of suboccipital or cervical or brachial pains showed more or less obvious postural faults and a muscle balance corresponding to that of the characteristic orthopedic case. Every case of hyperphoria above five degrees in both groups showed more complicated head tilting and rotation, more obliquity of the shoulder-girdle and more marked spinal curves and rotations, than were to be found in the cases of lesser ocular inbalance.

Our first conclusions from the work begun in 1915 were reached in 1917. Orthopedic results in cases of serious deformities are obtained thru patient muscular, ligamentous and nervous re-education, and when our results appeared sufficiently suggestive to warrant publication, as well as to estab-

lish priority, Dr. Lowman, in February 1918, submitted the main orthopedic fiindings and the hypotheses then reached, in the form of a candidate's thesis to the Committee on Membership of the National Orthopedic Association. This paper appeared in the American Journal of Orthopedic Surgery, Dec. 1918, p. 459-492 with the title "The Effect of Faulty Skeletal Alignment Upon the Eyes."

Risley (Amer. Jour. of Ophthal., May 1918, p. 357) is reported to have made a study of a number of cases of decided cranial and facial asymmetry. Hatters forms were made of many of these and the grotesque distortion which these forms showed was frequently coincident with such marked facial asymmetry as a relatively flat or even concave zygoma on one side paired with a large convex one on the other, and with much variation in the distance of the eye from the median plane. This variation of the location of the eyes in the orbit, in the form of the globe, in the length, line of direction and point of origin and insertion of the extrinsic ocular muscles were considered by Risley to be large factors in producing the refractive defects and muscular imbalances noted in these cases. Risley made no observation of associated postural defects of cranio-spinal alignment.

Stevens (N. Y. Med. Jour., Aug. 17, 1918), writing on "Right Handedness in Its Relation to Visual Conditions," correctly interprets the unsymmetric shape of the skull as the direct effect of the over development of the motor area of the left cerebrum to correspond with the racial prevalence of dextrality. In infancy there is bilaterality of cortical movements which wrongfully undergo suppression in the infantile period as the result of prevalent racial training. Repeated examinations show that the cranial asymmetry which results produces a distortion of the left orbit, the upper arch of which is pushed out, thus changing the axis of the cavity and, as measured by the clinoscope, leading to a left cyclophoria, a fact wholly in accord with our clinical findings. In some cases Stevens noted a right cyclophoria or a cyclophoria of each eye, and finds that such deviations usually occur in the left handed or ambidextrous; or in those who were left handed or ambidextrous when young, but whose natural and instinctive manuality had been forced into dextrality to accord with popular opinion and action. Stevens accurately concludes that the lack of symmetry of ocular position associated with the cranial asymmetry, leads naturally to imperfect symmetry of action and to imperfections of binocular vision. He finally urges that ambidexterity be encouraged, a conclusion which, in our opinion, ought to be broadcasted with epigrams to the effect that "An unequal brain development makes an uneven mind" by which the idea may be popularized. Stevens made no observation of associated cranio-spinal alignment.

Verwey (Amer. Jour. of Ophthal., Sept. 1918, p. 677) reports the correction of heterophorias of low degree thru inclinations of the head.

De Kleijn (Archives neerlandaises de Physiologie, tome 11, p. 644, 1918) shows that in the rabbit, alterations in the posture of the neck, especially of the two upper segments, provoke and maintain definite posture of the eyeballs. From the experiments, accomplished by extirpating the otic labyrinths, Sherrington (Brain, London, Nov. 1918, p. 332-343), in a masterly deductive paper on "Observations on the Sensual Role of the Proprioceptive Nerve Supply of the Extrinsic Ocular Muscles," reaches the conclusions that "sensory impressions of the neck posture have probably to be added to the factors implicated in visual imperceptions of orientation as regards verticality and inclinations thereto," the other factors concerned in spatial orientation being; 1, the retinal proprioceptive; 2, the muscular sense derived from the proprioceptive nerve supply of the extrinsic ocular muscles; and 3, otic labyrinthism. Sherrington emphasizes the fact that spatial perceptions are by no means purely visual but are rather "visuo-musculo-labyrinthine," the afferent nerve fibers in the extrinsic ocu-

lar muscles yielding sensory impressions which are the basis of perception of postures and movements and which aid the proprioceptive nerves of the rest of the body, and especially those of the "gravitational labyrinth" in registering the attitude of the whole body and its relation or orientation to the vertical.

The logical practical deduction from Sherrington's work, which we feel justified in making in view of the abundance of our clinical proof, is that when one leg of this proprioceptive quadrangle is defective the others take up the increased burden of maintaining or attempting to maintain normal spatial orientation, or yield under the added effort. Thus an altered state of the muscles supporting the shoulder-girdle, neck and head, by deviating the head from verticality, may produce an altered static state of the extrinsic muscles of the eyeball, which causes altered muscular sensation in maintaining the eyeballs in their new postures. We believe that this altered sensation may evidence itself in any leg of the quadrangle by symptoms such as actual visual (retinal) tire, muscular imbalance, or actual equilibrial (otic) disorder.

The stimuli which evoke compensatory muscular action and altered sensation in the extrinsic ocular muscles appear to be both gravitational and visual (retinal), and represent an attempt to keep the world right side up and in line with visual perspective realized as correct thru prior experiences. The converse deduction may explain the difficulties evoked by the correction of gross refractive defects for the first time late in life. Here both muscle sense and visual sense have long united in the assumption that their faulty muscle pulls and imperfect vision were normal and their reeducation to a realization of normal orientation is often impossible.

Returning to the question of the origin of many of these deviations from normal: The racial training which assumes, erroneously, that dextrality rather than the inborn state of ambidexterity is the correct state of man, causes the relative enlargement of the motor area in the left hemisphere. This occurs during the plastic years of the infantile period when there is no bar to the consequent enlargement of the left side of the cranium which, in being more capacious than the right, and heavier of content, leads to asymmetry of the orbits, of the face, of the position of the eyes in the orbits and of the muscular distribution and action, the last being partly the result of the orbital asymmetry and partly the result of faults of spinal and hence of general posture.

For purposes of skeletal mechanics the skull must be considered as a terminal vertebra whose unevenly distributed weight is superimposed upon the atlas and axis and to balance which there has commonly been developed a long total left lateral spinal curvature which is as normal to all dextrous individuals as the corresponding long right total postural curve is to the sinistrous. In scoliosis studies the more common of these curves, the "total left postural" or "functional" curvature has been considered merely as an uncompensated curve due to relaxation, habit, overweighting, etc.; whereas, in fact we have what should be classed as a right cranio-cervical, left dorso-lumbar curvature, in strict orthopedic nomenclature.

Where there is bodily symmetry, or where all the forces making for asymmetry balance, the result is a vertical orthophoria, it being assumed in this entire consideration that no pathologic conditions as nasal sinus disease and no truly congenital anomalies exist to complicate the situation.

The lateral muscular balance we consider in the main the result of cranial, orbital and facial asymmetry as affecting the relative positions and musculature of the eyes and there is no doubt, from our demonstrations of complete ocular muscular readjustments to normal of lateral imbalances following spinal realignment, that cranial posture with regard to verticality, whether purely of spinal or of cranial origin, or the product of both, is the

activating factor in this, as in most ocular imbalance.

The relation of the shoulder-girdle to these problems is both close and interesting. The shoulder-girdle may be considered for purposes of the mechanics involved, as being slung from the neck and occiput by the trapezius and the deeper muscles, these muscles fixing the girdle in all finely coordinated work of the hands and arms, fixing the neck during all visual concentration, and being concerned in the sensory impressions of neck posture as regards to verticality. In the dextrous the greater weight of the right shoulder and arm causes this to sag, drooping the right side of the shoulder-girdle. The left shoulder rises correspondingly, while the head tilts or rotates (uncomplicated tilting is almost unknown) to produce a left hyperphoria or, if the tilting exactly compensates for the shoulder-girdle alteration, a vertical orthophoria. Hence the vertical ocular balance must be considered the product of the cranio-spinal curves and the shoulder-girdle position, according to the presence and degree of dextrality or sinistrality.

Other factors modify or complicate this common relation such as the faulty head postures which are beyond question the result of intrinsic heterophorias, if such a term may be coined to identify those due to muscular defects inherent in the position, distribution and action of the extrinsic ocular muscles by virtue of congenital or occupational faults, as opposed to the heterophorias which are demonstrably the result of original faults of skeletal posture. Among such skeletal changes we find those due to unilateral leg deformities and faults in pelvic alignment, and the various spinal deformities associated with faulty postural habits or the results of spinal pathology. In not every such case, however, are ocular anomalies found, as in the case of a woman of 47 with tubercular disease of the right hip dating from childhood, who wore a shoe raised two inches, but whose spinal curvature caused by the unequal length of the legs, was fully compensated by this shoe, by other curves above and by a head tilt which yielded a vertical and lateral orthophoria as the sum of all the forces.

In a large series of orthopedic cases under treatment, correct shoeing, corseting, bracing, massage, spinal manipulation, hydrotherapy, head suspension and gymnastics, led in a few months to several years, to a correction or beneficial modification of low degrees of muscle imbalance of all sorts, as well as to a lessening of astigmatism in some cases and to its complete cure in five.

The largest class of patients whose symptoms have previously been most distressing and most discouraging, because hitherto almost unrelievable, is that showing from 2 to 6 degrees of exophoria at distance, exophoria for near of from 9 to over 20 and usually variable, adduction equal to or often less than abduction, frontal, suboccipital and nuchal aching, provoked by close work and usually worse the following day, soreness at various points along the spine and with an increase in general nervous symptoms which has long since, unhappily, placed this large and important group of cases among the psychasthenics. Some of these cases have little or no refractive error, tho the majority show compound hyperopic astigmatism of moderate to considerable degree. Excluding amblyopia ex anopsia and visual disparity due to accidents, the right eye is, for the most part, the fixing eye both for distance and for near, the left eye diverges when test objects are brought near, the left eye is the higher, and its axis is tilted (cyclophoria, or the positive declination of Stevens), all of these being in line with the observations previously noted in connection with structural faults of the left orbit, of the musculature of the left eye and of general cranio-spinal asymmetry. A careful orthopedic examination shows that, with hardly an exception, these cases occur in connection with abnormal spinal twists and rotations, especially cervico-thoracic, with irregular and painful impingements of normal or of abnormally broad lateral processes, with overlapping impingements of

the posterior spinous processes in cervical lordosis, with arthritic enlargements of the articulations, fibrositis and periarticular thickenings due to ligamentous strain and trauma, cervical ribs, etc. Nearly all of these cases show muscular spasm and soreness, over the points of muscular and ligamentous insertion which are being unduly stretched as the effect of faulty skeletal alignment. A common fault is the lateral bending with rotation which occurs in scoliosis, where lateral and antero-posterior deviations of the shoulder-girdle exist with so much stretching of the brachial plexus as to cause brachial pain and incorrectly termed "brachial neuritis." The ocular disturbance so often associated is probably partly due to the reflex effect continuously produced in the cervical sympathetic.

In most of these cases the true relation between cause and effect is clearly shown by the more or less prompt relief to nervous, spinal and ocular symptoms which follows corrective orthopedic measures. In many cases where the abduction is weak the relief is distinctly accelerated by appropriate prism exercises, fixation exercises for improving the near balance, graduated reading and careful visual hygiene. In a few cases complete relief has not been obtained from these corrective measures. Possibly here the general postural asymmetry is excessive, and the uneven cranial weight and the uneven shoulder weight and action combine with occupational habits to maintain the postural fault to a degree.

Two practical points of ocular hygiene arise from this investigation: 1. In the cases which develop symptoms referred to the neck on close ocular fixation, attention should be given to correct seating, and to such cranio-cervical support and consequent relaxation that contraction of the erector spinae group cannot be maintained stiffly or, at least can be minimized. 2. In those cases where occupation demands ocular fixation combined with intense shoulder-girdle fixation, such as in sewing, reading and typing and especially when without arm support, the symptoms are often induced more by the weight of the hands, forearms and arms dragging upon the trapezius and keeping it contracted, than by the process of shoulder-girdle fixation alone. Here again the relief can be obtained by relaxation gained by correct seating, correct posture, by voluntary relaxation of the back and neck and especially by providing chairs with arms to relieve the shoulder-girdle of the pendant weight. Herein also lies the great value of the reading stand or rack which allows complete shoulder-girdle relaxation and permits the reader, as well, to assume a completely relaxed posture of head and spine.

The writer presents this elementary work, with all of its obvious imperfections, in the belief that a new point of attack and a means of prevention are shown against conditions, the persistence of which has been a source of discredit to ophthalmology, no less than to medicine as a whole.

Finally, the assistance and inspiration of Dr. Charles L. Lowman in this work are hereby acknowledged.

CONCLUSIONS: 1. We have established the first practical therapeutic connection, if not the first postural connection, between cranial asymmetry and spinal curvature.

2. We have made the first demonstrations that the common faults of head position, hitherto ascribed solely to faults of action and distribution of the extrinsic ocular muscles, often may be due to structural skeletal faults original in the lower extremities or spine; which affect the eyes thru their influence upon head posture, as well as thru their effect upon the cilio-spinal sympathetic center and the sympathetic pathways.

3. For the purpose of skeletal mechanics the head must be considered as a great terminal vertebra which assumes compensatory postures in the case of postural defects original in the extremities and spine, and gravitational postures due to its own imbalance on the spine, unless fully balanced by compensatory spinal curves.

4. Excluding conditions orginating from diseases, the basic skeletal faults

deemed responsible for many functional defects in the eyes and nose and, for much ocular and cranial pathology, are those arising from asymmetry of the cranium in connection with the racial prevalence of right handedness and the less common left handedness. From this asymmetry spring orbital distortions, and alterations in the positions, muscular distribution and muscular actions of the eyes, the left eye being mainly affected thru its proximity to the larger left cerebral hemisphere and the large left cranial fossae, and left hyperphoria, cyclophoria and left adductor weakness being the common muscular defects. From this common origin come also asymmetry of the facial bones, of the shape, position and ease of drainage of the nasal sinuses, and faults of the bony and cartilaginous septum, of the hard palate, the jaws and teeth.

5. To balance the unsymmetrically placed weight of the head on the spine long, lateral, compensatory curves of the spine are developed. These are exaggerated or further complicated by the effect of dextrality or of sinistrality in uncompensated shoulder-girdle deviations, which induce further changes in the posture of the head, thus neutralizing or exaggerating the cranial posture which would otherwise have resulted.

6. These faults of cranial posture influence the proprioceptive functions of the extrinsic ocular muscles, the retina and the muscles of the neck, and undoubtedly put more strain upon the labyrinthine mechanism in their efforts to readjust the ocular position with regard to verticality, or spatial orientation.

7. Stabilization of the head on the neck and shoulders is almost as essential to all intense and prolonged ocular fixation as the more limited action of the extrinsic ocular muscles. Stabilization of the shoulder-girdle is equally an essential, when finely coordinated manual work is the object of the ocular attention. Strains of this stabilizing system thru its overuse, and especially in the presence of spinal faults and uncompensated shoulder-girdle deviations, produce the distressing suboccipital, cervical and brachial symptoms incident to reading and to many occupations.

8. Severe ocular imbalance is found more commonly among cases which are primarily orthopedic than among average eye cases. Cranio-spinal postural defects are found almost uniformly in the eye cases complaining of suboccipital and nuchal aching and are, in the main, capable of relief or cure by methods of relaxation and by appropriate orthopedic and ophthalmic procedure. As a result of such treatment we have noted the lessening and disappearance of ocular muscle imbalance and, in a few cases, the lessening or disappearance of corneal astigmatism. (Our original investigation was limited to the relation of postural and eye-muscle defects; and it is likely that complete comparisons of the corneal astigmatism before and after alignment would have given a much higher number showing astigmatic changes.)

9. The logical applications of our work to preventative medicine are, (a) Ambidexterity must be insisted upon during the infantile period and the plastic, developmental years. This will produce not only the symmetric development of the cerebral hemispheres, but is the means of symmetric development of the cranium and of the superficial and deep components of the face. In this way developmental malpositions of the orbits, the eyes, the nasal cavities, jaws, teeth and spine will be prevented and the pathology which has its foundation in these early defects will be avoided.

(b) The prevention of ocular faults resulting from faulty spinal alignment lies, obviously, in the early recognition of the spinal defects by the pediatrist and by those responsible for our school hygiene, and in their cure in youth by the orthopedic surgeon.

THE CONTROL OF TRACHOMA AMONG THE ALIEN LABOR COMPANIES OF THE BRITISH AND AMERICAN EXPEDITIONARY FORCES

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As Lieut.-Col. and Assistant Ophthalmic Consultant of the American Expeditionary Forces, Dr. Derby had to deal with the problem of trachoma. He here describes the classification, segregation, and treatment of the infected men. Presented to the Section on Ophthalmology, American Medical Association, June 11th, 1919.

Civilian labor was employed to a very considerable extent in France by the French, British and American forces. In many instances, these laborers were drawn from races in which trachoma is a common disease, and a large number of the individual laborers were themselves infected.

The history of the spread of trachoma among the armies of the various nations, before proper methods of control were in force, is well known. A few figures taken from Eason's article read at the 1918 meeting of the Ophthalmological Society of the United Kingdom may be given here. On the invalid list of the British Army during 1818 were more than 5,000 soldiers rendered blind by trachoma. From 1813 to 1817, from 20,000 to 30,000 men of the Prussian Army were affected. From 1816 to 1839, over 76,000 men in the Russian Army were trachomatous. A Belgian Army was disbanded because the disease was so prevalent and spread infection thereby thruout the civilian population.

The introduction of alien labor companies into France, in some of which trachoma was prevalent, brought a certain amount of danger to the civilian population and to the armies themselves. It was my fortune, while stationed with the B. E. F., in 1917 and part of 1918, to have an opportunity to study the British system of trachoma control and to take a small part in some of their work. Later, the task of inspecting the labor companies in the American Expeditionary Forces for trachoma was assigned to me, and as our plans for this work were modeled entirely on the system so admirably carried out by the British, I may be permitted to give a rather full description of their work.

BRITISH EXPEDITIONARY FORCES.

In the spring of 1917, the disease was noted among the Egyptians and Chinese to a considerable extent, and it was decided, after a consultation held between Colonel W. T. Lister and Major J. F. Cunningham of the Ophthalmic Consulting Service with the various army authorities interested, that a complete examination of these nationalities should be made. Orders were immediately sent out to the effect that "no cases with definite trachoma granulations or acute conjunctivitis be allowed to embark from Egypt or China or disembark in this country." Of several thousand Egyptians it was found that 19 per cent had active trachoma, and a serious problem arose as to the handling of them. They had been enlisted in groups in Egypt, each group under its own headman, and they could not be separated from him. Luckily, their stay in France was to be a short one, and therefore the measures employed in general were segregation, disinfection and treatment in each company.

The main problem was among the Chinese, for they came to stay and in large numbers,—over 100,000. There was some difficulty at first, as companies had been sent out in which a certain number of trachoma and conjunctivitis cases were mixed in with the clean men. As time went on, however, and the system became established, it was possible to remove the infected ones from these companies and to replace them.

Under the energetic guidance of Colonel Lister, the Ophthalmic Con-

sultant, and of Major J. F. Cunningham, a most excellent system was established and began to work in July, 1917. On the arrival of each shipload of men at Chinese headquarters, in addition to a general examination each man had to have his lids turned and inspected. These inspections were carried out by men familiar with the disease. If the lids were healthy and there was no conjunctivitis, the man was placed in a clean or "X Company." When conjunctivitis was discovered and no evidence of trachoma, the man was placed in a conjunctivitis or "Y Company." Trachoma cases were put in trachoma or "Z Companies." Doubtful cases of trachoma were usually placed in the "Y Companies." These labor companies were usually formed of 500 men, and were sent out from headquarters to the various areas where labor was required.

Clean companies, under medical officers without ophthalmic experience, could be sent anywhere, so long as provision was made for occasional inspections by ophthalmic specialists. These inspections were necessary, for although directions had been sent to China not to embark infected men, yet, owing to the difficulties of obtaining coolies entirely free from the disease, a certain number of trachomatous cases came over with practically every shipment, tho the number showed a very satisfactory diminution as time went on. It was impossible to hold clean men at headquarters for a sufficient length of time to rule out contagion, and therefore it was to be expected that trachoma would appear from time to time in the clean companies, as it did, since all these men were contact cases.

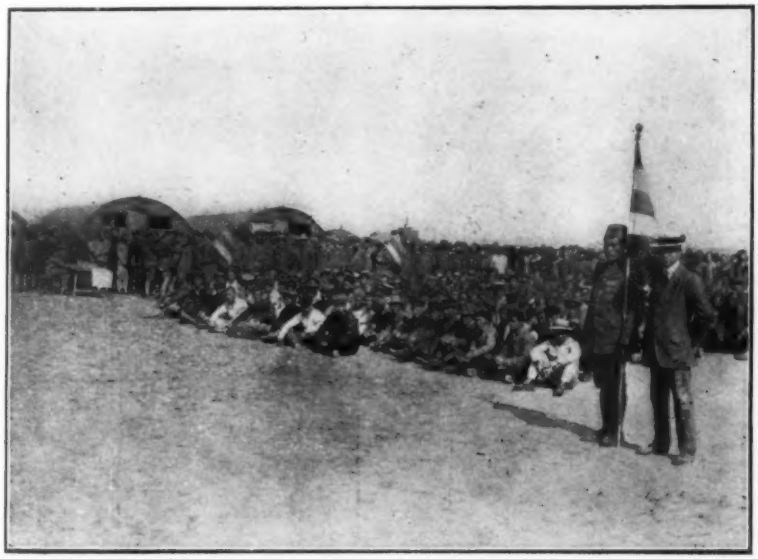


Fig. 1. Labor company in France drawn up for inspection.

The Y and Z cases were sent to places designated as "Trachoma Treatment Centers," where they were under the supervision and care of an ophthalmologist.

Examination carried out at Chinese Headquarters over a period of nine months showed that 5.04 per cent of the Chinese arriving had active trachoma, while 13.49 per cent had conjunctivitis, and many of these latter were well on their way to recovery from treatment received before they were sent out, and it was possible to place them in clean companies. The trachoma figures did not include a number of the early companies in

which the percentage of disease was large. Colonel Lister's figures in a report sent in a few months ago show, among 100,000 Chinese, approximately 8,500 cases of acute infectious trachoma and 5,500 cases of suspicious conjunctivitis.

Inspections of companies in the field were carried out by Colonel Lister and his assistants at frequent intervals, care being taken to examine the men at a time when it would interfere with labor as little as possible. Owing to the central location of Colonel Lister's headquarters (Boulogne) in relation to the British front, it was possible to examine a number of companies on a single day if the schedule was well planned. The Chinese were lined up in three or four files, according to whether three or four officers were to make the inspection, and came up in turn for the examination. Behind the examining officers sat the recorder at a table. Clean cases were immediately passed. If a conjunctivitis or trachoma case was detected, the man was detained by a non-commissioned officer, his number ascertained from his identity disk or wrist band, and it was recorded in the appropriate column of the recorder's book. The number examined was also recorded, so that there was a permanent record of all cases of disease and the men could be transferred to their proper companies. One copy of the record was left with the company. Under the system adopted, these examinations were carried out with great speed. With three medical officers examining 500 men could be gone over in 25 to 30 minutes.

Fig. 2. Method of inspecting the eyes for trachoma, four officers inspecting, recorder taking number of man found infected.

TREATMENT—As the Chinaman is prone to develop conjunctivitis, especially if working in a dusty atmosphere, Coloned Lister instituted the so-called "Universal Drops" treatment for the clean companies. This consisted in dropping a solution of zinc sulphat and boric acid into the eyes of each man once a day, preferably after returning from work. The men were taught to squat down in two long rows facing each other and to draw down the lower lids with the fingers. A Chinese medical orderly passed down in front of each one and instilled the drops. He was assisted by a man who passed behind the row and steadied the head

of each individual. As each row was treated, it was replaced by another, and the whole company was finished in about twenty minutes. The milder cases in the Conjunctivitis (Y) Companies were treated in the same way. In severe cases the lids were painted with silver nitrat or protargol.

Trachoma (Z) Companies had the treatment appropriate for each case—expression, silver nitrat, or the copper stick. Corneal ulcers were treated as in civil practice. An important factor in the limitation of the spread of this disease was regular sterilization of the Chinaman's towel twice a week.

By the procedure described it was not expected that these laborers would be cured of their trachoma, but it was expected that the spread of the disease would be limited, and that their working efficiency would be raised to the highest point practicable. I believe that these ends were accomplished. Trachoma if untreated leads to a loss of working power.

To quote from Colonel Lister's report: "The first examination of two (of the earlier) companies revealed 12 cases in one and 15 in the other. Owing to the importance of the disease not being recognized by the authorities, the treatment advised was not carried out and the notified cases of trachoma were not moved. In eight week's time there were 59 cases in one company and 81 in the other."

"A trachoma company was sent up to an army area for about six weeks and was untreated. At the end of this time the average number of men off duty daily for eye trouble was 30, and 15 men had been sent down to Headquarters as unfit to work."

This last company was sent down to the Base and was put under the treatment of Captain Hine, Ophthalmic Specialist at Camiers, with whom I saw them in October, 1917. Out of 588 men, 68 needed expression. From 30 off duty daily in October, the number fell under proper treatment to 7 in December and 2 in January. In two other companies the number off duty fell in four months from twenty-five to none.

No case came to notice of the disease having spread either to the civilian population or to troops. The Controller of Labor has stated that the men off duty in the affected companies was no greater than in the unaffected com-

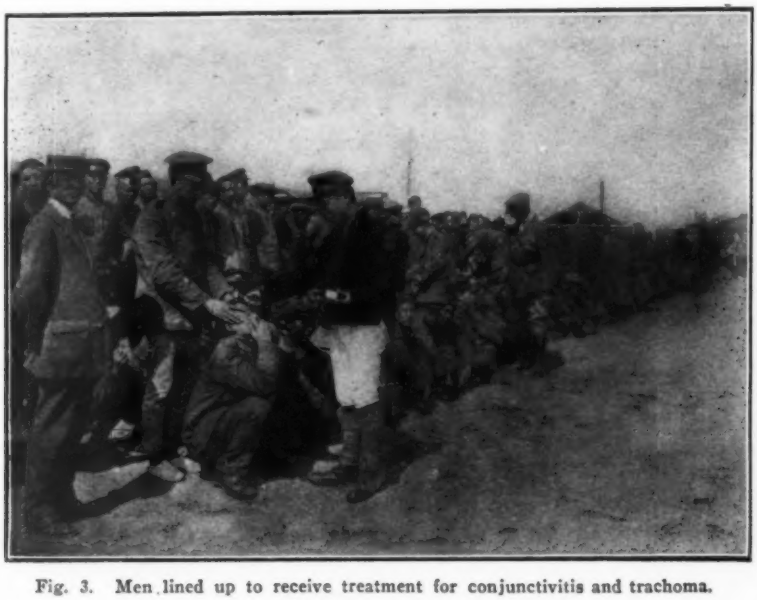


Fig. 3. Men lined up to receive treatment for conjunctivitis and trachoma.

panies. Not more than two or three patients a month were sent back to Chinese Headquarters as unfit to work.

A system of ophthalmic reports was instituted giving the essential facts as to eye disease in each company, including the number of men off duty daily for eye disease. By a glance at these cards it was possible to see which companies were in need of attention. A system was also instituted by which

Fig. 4. Method of instilling drops while assistant steadies the head.

the various areas of the British Expeditionary Force were divided so that sufficient inspections could be made.

American Expeditionary Forces.—In July, 1918 the Division of Ophthalmology of the American Expeditionary Force was asked by the Medical Division of the Labor Bureau to make an inspection of the administrative labor companies, with a view to ascertaining the amount of trachoma existing and to suggest any necesary measures for its control. This duty was assigned to me by Leuitenant-Colonel Greenwood, the Senior Ophthalmic Consultant. A conference was held in Paris with Major W. H. Honor, the Chief of the Medical Division of the Labor Bureau, who, like myself, had served with the British Expeditionary Force and was familiar with the British trachoma problem and the way in which it had been handled. We agreed that our work should be carried out along the same general lines, but adapted to the special conditions which existed in the American Expeditionary Force.

We had in the neighborhood of 180 companies to be inspected, scattered over the whole area of France occupied by the American Expeditionary Force, from the aerodromes close to the front, back to Bordeaux and the other Base Ports. The companies were all taken over from the French, who organized them, and were all inspected by the French for contagious eye disease at

the various centers at which they were gathered together. Their disciplinary control was in the hands of the French, a fact which created difficulty in a number of instances. Racially, they could be divided into Chinese, Indo-Chinese, North Africans and mixed. The North Africans were composed of several different races—Moroccans, Algerians, Tunisians, etc. There were French Companies, Spanish Companies, many Portugese and other nationalities, but these for convenience we classified as mixed.

The work of inspecting the companies in the advance zone began on August 7. In general, the companies were notified several days in advance that an inspection would be made at a certain hour. The hour was chosen so as to interfere as little as possible with the labor of the company. In some cases the companies were examined on Saturady afternoon after working hours, and in some cases on Sundays. In certain instances, inspections were held before the men went to work or after returning from work,

Fig. 5. Method of watching progress of infected cases.

Owing to the pressure of the other duties, it was impossible for me to devote a continuous period to this survey, and the examinations were spread over a period of four months. The companies in the advance zone were covered by short trips from the Medical Consultants' Headquarters at Neufchateau, while those in the intermediate and base sections were covered by a special tour beginning on October 10 and ending November 10.

Our companies were small, sometimes not more than 50 men and never more than 300. They were very widely scattered and engaged on all sorts of projects.

during the period when the light of the summer season permitted. In the majority of cases, the work was done either just before or after the noon meal. There was no uniform schedule of labor for these companies. Some did not work the latter part of Saturday afternoon and some did not work on Sunday, and it was difficult to hold them for examination outside of their working hours. Inspections were, (in all but two instances) carried out by me, usually with one assistant, sometimes more.

The technic of the examination was that used by the British, already described. A record was made of the

individual numbers of the men affected. A copy of this record was left with the company, a copy was sent to the Medical Division of the Labor Bureau, and a copy filed in the Consultants' office. Thus, at the end of the inspection we had a record of all the diseased cases found at the time of the examination.

Cases were classified as Z, or trachoma, only when the diagnosis was evident. All doubtful cases were classed as Y, or conjunctivitis. In the Y class it was attempted to put only doubtful cases of trachoma and cases of conjunctivitis with secretion which appeared to be contagious. During the examinations, quite a number of cases of old trachoma, noncontagious, with smooth conjuntiva and old scars were encountered. These were passed as being harmless. The largest number of this group appeared among the North Africans. A number of eye conditions other than conjunctivitis were discovered and their treatment provided for.

Fig. 6. Men bringing their towels for disinfection.

Our figures show that 12,461 laborers were examined; and that among them were 1,618 cases of conjunctivitis, 13 per cent; and 261 cases of trachoma, 2 per cent. If we separate the nationalities we find:

1. Northern Chinese, 4,958 examined; 1,090 with conjunctivitis, 21 per cent; and 160 with trachoma, 3.2 per cent.

2. Indo-Chinese, 1,795 examined; 284 with conjunctivitis, 16 per cent; and 44 with trachoma, 2.4 per cent.

3. North Africans, 1,291 examined; 51 with conjunctivitis, 4 per cent; and 18 with trachoma, 1.5 per cent.

4. Mixed, 4,417 examined; 193 with conjunctivitis, 4.3 per cent; and 39 with trachoma, 0.9 per cent.

As noted before, the North Africans showed a large percentage of healed trachoma.

Our percentage of trachoma among the Northern Chinese (3.2 per cent) is much lower than that found at first by the British (8.5 per cent), but compares well with their later shipments. This may be accounted for by the fact that a number of our Chinese companies examined had already been gone over and the cases of trachoma weeded out. Several of the companies that had been previously weeded out, however,

showed a number of fresh cases of trachoma and a considerable amount of conjunctivitis. As a rule, the trachoma seen among our Chinese was in an early stage. In very few cases was it disabling.

As it was not possible in the beginning to follow the British lead and establish conjunctivitis and trachoma companies for the diseased eyes, it was decided temporarily to look after them in each company, as no other course remained open to us under the circumstances. A circular was therefore drawn up and sent out to every company by the Labor Bureau describing the purpose of the examination and the various measures to be employed. After the examination of each company, or of each group of companies when more than one were in the same area, the Commanders of companies, the Medical Officers responsible for them, and when possible the Ophthalmic Specialist attached to the nearest hospital, were gathered together and the situation was thoroly discussed and instructions given for the isolation and treatment of the Y and Z groups.

In many instances, the companies were in fairly close proximity to a Base or Camp Hospital at which there was an ophthalmologist stationed. He was informed of the policy decided on, and the general direction of the eye situation was intrusted to him. Active cases of trachoma were treated by him, as were those of the conjunctivitis group which needed special treatment.

A report was made to the Chief Surgeon of the American Expeditionary Forces, and to the Labor Bureau, giving in detail the figures of the various companies and the following recommendations were made:

"Trachoma cases should be isolated in special companies. These companies should be worked in some hospital area where they can be under the supervision and care of the Ophthalmic Specialist. The Director of the Labor Bureau has already ordered the formation of a trachoma company at a hospital center." Until these trachoma or Z cases could be transferred to such a company, instructions were given to include them with the Y or conjunctivitis cases.

"Conjunctivitis cases (Y) should also be put in special companies and given appropriate treatment. Until this can be carried out, the following course should be adopted, and the Commanding Officers of all companies have been instructed in the procedure. The men should be isolated in a separate barracks or part of a barracks. They should, as far as possible, wash separately, eat separately and work separately from the clean men. Their towels should be boiled for thirty minutes twice a week, as should handkerchief when in use. Local treatment consists in the administration of zinc sulphat drops (.3 per cent) twice a day. This treatment may and should be carried out without interfering with labor."

A detailed description of the British system of using the "Universal Drops" was then given as already quoted.

"The Y, or Conjunctivitis cases, should be examined by an Ophthalmic Specialist every three weeks. In six weeks, it should be possible to tell which of the suspicious cases are in all probability trachoma, and measures taken accordingly. Where trachoma has existed in a company, a certain number of the X, or clean, men will later develop it, and these must be carefully watched for. Unfortunately, labor companies move so frequently that arrangements for the supervision of the Y cases will break down in many instances under this system. If alien labor companies, especially Chinese, are to be employed for any long period of time by the American Expeditionary Forces, some provision for the formation of Y companies should be made."

"Clean (X) Companies.—The Medical Officer in charge of X Companies should be on the constant lookout for fresh cases of eye disease. If these cases do not respond to treatment in a short period of time, the advice of the nearest Ophthalmologist should be sought."

It should be remembered, in con-

sidering the trachoma problem, that the ordinary methods of handling trachoma in civil life do not apply here. We were in France to help win the war, and it was our duty to help the labor authorities by every means in our power by getting every possible ounce of work out of the labor companies. The British had shown conclusively that under a well organized system the disease could be controlled and labor rendered more, rather than less, efficient. Moreover, in the busy times we faced it was impossible to occupy hospital beds with any considerable number of trachoma cases. Rather than do this, the authorities preferred to send the laborers home, and in but few instances was this necessary.

A comparatively small number of cases of trachoma was found among our soldiers in France, and the proposal was made by the Senior Ophthalmic Consultant to the Chief Surgeon's Office that all such cases be segregated in a hospital area where they could have proper treatment and could be used as labor. On the ground that there were not enough of them to make this procedure worth while, this suggestion was not acted on, and they were held for treatment in the various hospitals.

In a large part of the inspection Lieutenant-Colonel Nelson M. Black, M. C., was associated with me and was of the greatest assistance. At times when Lieutenant-Colonel Black was not available. I was very efficiently aided by Lt. H. B. Chandler, M. C; Captain Ralph Hatch, M. C.; Lt. R. J. Sprowl, M. C.; Captain Lloyd Whitham, M. C.; Captain C. F. Jump, M. C.; Major George W. Jean, M. C. At all times the assistance and cooperation of the Medical Division of the Labor Bureau was given without stint.

I feel strongly that the Ophthalmic Service of the American Expeditionary Forces owes a very large debt of gratitude to the British Service, not only in the special line of trachoma, but in many other ways. Many features of the admirable system developed by Colonel W. T. Lister, ably seconded by Major J. F. Cunningham, were taken over by us and added greatly to the development of our service.

The following circular was issued by the labor bureau for the instruction of their officers and personnel:

AMERICAN EXPEDITIONARY FORCES

Labor Bureau, A. S. C.,
Office of Surgeon,
Medical Division, A. P. O. 717,
France, Oct. 21, 1918.

Circular No. 4.

To Medical Officers Assigned to Administrative Labor Companies.
(Through Commanding Officers.)

1. A survey is now being made of the Administrative Labor Companies, A. S. C., under the direction of the Medical Division, Labor Bureau, by the authority of the Chief Surgeon American Expeditionary Forces, as described in Circular No. 2, Medical Division, Labor Bureau, Aug. 7, 1918. The purpose of this survey is to determine the extent of contagious eye diseases with the view of preventing infection and promoting efficiency.

2. Administrative Labor Companies, especially those composed of Chinese and Indo-Chinese, are frequently liable to two contagious eye diseases, Conjunctivitis (pink eyes), often in its chronic form, and Trachoma.

Conjunctivitis is a contagious eye disease which spreads rapidly by contact. It is, however, readily curable under proper treatment, and suitable precautions will limit its spread.

Trachoma is likewise contagious; but unlike conjunctivitis, it is very resistant to treatment and in its more severe forms produces irreparable damage to the eyes and may interfere seriously with the efficiency of laborers infected. Certain early cases of trachoma are impossible to distinguish from chronic conjunctivitis until they have been for some time under observation. The spread of trachoma may be checked by suitable measures. Proper treatment will arrest its progress.

Contagion. Both diseases are con-

veyed from one individual to another by direct contact with secretion from the affected eyes, by personal contact, by infected towels and by the use of the same wash basins. Cleanliness is the greatest enemy of these diseases.

Classification. The present survey will divide the laborers of each company into three classes:

Class X comprises the individuals with clean eyes.

Class Y comprises laborers with conjunctivitis. A few of these may later show trachoma.

Class Z—Trachoma cases.

3. As a *Preventive* measure in all labor companies, each man should have his individual towel and soap. Towels should be boiled for thirty minutes twice a week. The same should apply to handkerchiefs.

Class Y should be isolated so far as possible without interfering with their labor. They should live in a separate hut from Class X, or, at least, a portion of a hut should be partitioned off for their use. They should wash separately and eat separately from Class X, and should work in a squad by themselves as far as is possible.

Local treatment of Class Y need in no way interfere with their labor. An aqueous solution containing one-third of one per cent Zinc Sulphate and two percent Boric Acid is used.

This treatment is best carried out in the following manner: At a suitable time before going to work and after returning from it, Class Y cases report for treatment. They squat down on the ground in one or more lines, pull down their lower lids and look upward. The Medical Orderly passes along the lines with an assistant. The assistant, who stands behind the laborer, steadies the head with his hands, the Medical Orderly in front instills with a dropper one or two drops of the Zinc Sulphate solution which he carries in a small glass. This procedure may be carried out easily without having the dropper come in contact with the eye that is being treated. An orderly may be quickly trained in this work. By this method, up to one hundred cases may be treated in fifteen minutes. After the application of Zinc Sulphate, the eyes will smart for from one to five minutes, but not longer.

4. Z *Cases* will be reported by number to the Medical Division, Labor Bureau, A. P. O. 717. Orders will be issued transferring them to special trachoma companies. During the interval between the discovery of trachoma Z cases and their removal, they will be subject to the same precautions and treatment as pertains to Class Y. If due precautions, as outlined, are observed, laborers infected with conjunctivitis, X cases, and trachoma, Z cases, may be handled without danger of infection to other laborers or troops.

W. H. Honor,
Major, M. C., U. S. Army
Surgeon Medical Division, Labor Bureau,
A. S. C

GRANULOMA OF THE CORNEA

M. Feingold, M.D.

NEW ORLEANS

With reports of two cases, this paper gives a critical review of the literature, and draws the conclusions it seems to justify. Read before the American Academy of Ophthalmology and Oto-Laryngology, August 5, 1918.

Possibly no structure of the body has been the subject of so much study, clinically and especially experimentally, as, owing to its peculiarities, the cornea. But in spite of the many varieties of corneal affections described, and tho the process of healing of wounds of all kinds of this structure, has been studied and recorded minutely, one fails to find, even in the best and most modern textbooks, any mention of granuloma formation of the cornea. For this reason, the following cases seem to deserve recording, and a review of the few cases reported in the literature might not be amiss. This seems especially desirable since some of the case literature is not easily accessible and because the condition is generally placed among the tumors of the cornea instead of among the inflammations and their consequences.

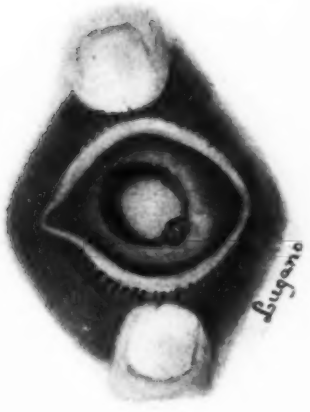
Case 1.—H. J., colored, laborer, aged 56, applied at the Charity Hospital Eye Clinic, Nov. 9, 1917, stating that, three weeks before, muriatic acid had splashed into his eyes and that the right one was so badly injured by it that enucleation had to be done two weeks later. The conjunctiva of the eyeball appeared reddish white, the whole cornea grayish, and he could notice hand movements. Gradually a grayish-red soft granuloma 3 by 3 by 2 mm. appeared on the conjunctiva of the eyeball at the lower temporal limbus, and a similar flat one 3 by 1.5 mm. at the upper temporal limbus.

Dec. 6, 1917, the lower granuloma was seen riding on the limbus with its greatest portion on the cornea, while the smaller granuloma was entirely on the cornea near the upper limbus. The cornea appeared at first glimpse quite clear in the peripheral portion, but this was due only to invasion of superficial and deeper vessels from all sides; thru it, the iris could be guessed at. The central portion was whitish opaque and slightly depressed, with irregular surface. Light projection and color perception were good.

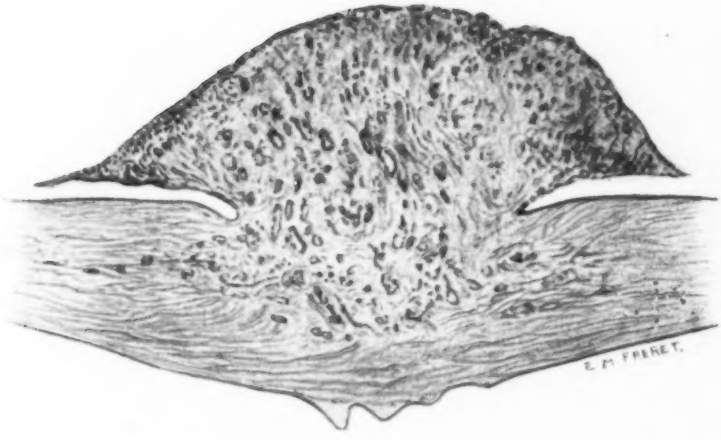
Later the upper granuloma moved 2 mm. from the limbus to the center getting smaller at the same time and appearing more red; the lower granuloma also grew smaller and more flat. The central area of the cornea became more bluish white and smaller, because encroached upon by the increasing ring of vascularization; the thickened grayish-red conjunctiva of the eyeball extended on to the cornea forming a false pterygium in several places. This was especially noticeable at the seat of the lower granuloma, which in the meantime had moved away from the limbus, leaving a narrow band of cornea between itself and the limbus. The upper nasal portion of the cornea cleared perceptibly and the patient could see faces.

Three months after the accident, the lower granuloma was smaller, triangular, and apparently pedunculated while the upper granuloma had entirely disappeared. During the further observation even the lower granuloma faded away gradually and the whole cornea cleared sufficiently so that, about May 1, 1918, patient could read 2-inch letters close to the eye. During the whole time the tension was carefully watched and always found to be below normal on palpation. Only once did the tension seem to be increased. Treatment consisted only in inspersion of ethyl-morphin hydrochlorid powder. See Fig. 1, Plate XI.

Case 2.—E. B., a farmer, aged 42, called at the Charity Hospital Eye Clinic, Sept. 29, 1915, because of inflammation of his right eye, which had begun when some unslacked lime got



CASE 1. GRANULOMAS OF THE SCLEROCOREA.



CASE 2 GRANULOMA OF CORNEA. MALLORYS CONNECTIVE TISSUE STAIN: X24.

into his eye three weeks before. The eye showed moderate ciliary injection; the corneal epithelium was markedly defective, the cornea itself diffusely nonsaturated, bluish, opaque with a deep seated, round, 3 mm. gray infiltration slightly below the center. There were 3 mm. of hypopon.

The hypopyon soon became absorbed but recurred several times. Gradually a small, soft, redish-gray tumor of granulation tissue appeared near the center of the cornea. Acetylsalicylic acid, ethyl-morphin hydrochlorid, argyrol, atropin, and physostigmin (eserin) were used to meet symptoms and indications. Repeated attacks of severe pain caused by increased intraocular tension finally necessitated enucleation which was done under local anesthesia, March 20, 1916. The eyeball was immediately placed in Zenker's solution, after hardening bisected in the equator and sectioned horizontally by Lee's dry celloidin method.

Histologic examination.—In the conjunctiva only a few plasma cells are seen, but the epithelial cells have a tendency to desquamation. The cornea is slightly pressed in toward the anterior chamber in the central part. This was apparently caused by the lid bulging the softened cornea in, when pressing on the projecting growth. The cornea is about 0.6 mm. thick in the periphery, somewhat thicker in the central portion. Here a mushroom-like growth is lying on the surface and is continuous with the corneal substance by its very short pedicle. The epithelium is missing on the whole corneal surface. At the limbus the epithelium of the conjunctiva projects for a short distance over the cornea, but is not in contact with it, forming a folded band which often folds back on itself toward the limbus. See Fig. 2, Plate XI.

But for an isolated, cell-like structure here and there, Bowman's membrane is entirely bare of epithelium. It is continuous over the whole surface of the cornea, except for about 0.98 mm. in the center corresponding to the pedicle of the growth. It is about 16 microns thick and seems to consist of two portions. The superficial one is about 3 microns thick and stains rather deeply with hematoxlyin and purplish with Mallory's connective tissue stain. The posterior portion stains more like the corneal substance. The anterior portion splinters off here and there to some extent from the underlying portion. Bowman's membrane, and to a slighter extent the adjoining lamellae of the cornea, contain numerous, small, amorphous and more crystalline, yellowish brown particles of different size (argyrol?). Bowman's membrane is everywhere in normal contact with the underlying parenchyma. In some sections, near the pedicle of the growth, masses staining intensely blue with hematoxlyin are seen between Bowman's membrane and the parenchyma and also in the spaces between the next three or four layers adjoining. These masses are fine and linear or more lumpy and often mask the corneal struture entirely (lime?). Numerous vessels pervade the whole cornea, lying mostly in the anterior two thirds. A few smaller vessels are immediately below Bowman's membrane. In the immediate neighborhood of all the vessels are seen cells, each with a long nucleus, staining deeper than the corneal cells, also an occasional eosinophil. The whole cornea is seemingly unaltered except that the fixed cells are evidently more numerous than normal. Higher magnification reveals some of these, at least, as possibly wandering cells, since their nuclei stain deeper blue and since two or three cells are at times seen in the same space. Except for the affected area, the cornea shows no differences in the arrangement and appearance as to color, etc., of the lamellae, in spite of the marked opacity in vivo.

The affected area is about 2.8 mm. in the largest diameter and is consequently larger than the defect in Bowman's membrane. It is roughly lenticular in cross section, that is, thickest in the center. It occupies the middle layers of the cornea, leaving the posterior fourth entirely free. Its edges are entirely in the deeper layers with comparatively unaffected corneal substance in front of it. Over the central

portion, on the other hand, corresponding to the defect in Bowman's membrane, this area extends even thru the anterior layers, and is here continuous with and forms the pedicle of the mushroom-like growth on the surface. In the affected area, the lamellae have lost their parallel arrangement, have changed direction, and have a tendency to bend forward into the pedicle. The lamellae are more widely separated and are possibly fewer in the center. The vessels are very numerous, especially near the pedicle. Between the separated lamellae and surrounding the blood vessels, numerous cells of the following types are found: (1) cells, each with a large, pale vesicular nucleus: endothelial and young connective tissue cells; the nucleus is often smaller and distorted by the surrounding tissue; (2) plasma cells; (3) polymorphonuclear leukocytes; (4) occasional eosinophilic leukocytes; (5) small, round cells, apparently lymphocytes; (6) cells in mitosis, most probably of the type mentioned in Group 1. The character and arrangement of the cells varies from place to place. Here the plasma cells prevail, there the polymorphonuclear leukocytes, etc.

The growth projects above the surface of the cornea about 0.93 mm. and is about 2.25 mm. in the greatest meridional diameter. It is button or mushroom-like, overlapping the cornea because it is bigger than the opening in Bowman's membrane, through which it is continuous with the corneal substance. Only in a small area does the growth appear more sloping on the surface and not overhanging. It is not covered by epithelium. On and near the surface, a network of fine fibers, arranged more or less parallel with it, is seen. These fibers have all the appearance of fibrin. Here they enclose an edematous area, there the network contains numerous leukocytes and traces of extravasated blood in other places. The skeleton of the growth is made up of more or less radially arranged fan-rib-like septums of connective tissue and possibly of some remnants of corneal tissue. Small and large vessels often showing bifurcations are very numerous. The vessels are arranged in a fanlike manner as in papilloma and near the surface are seen rather large sinus-like cross sections, filled with blood. The space between the connective tissues groundwork and the vessels is filed with cells of various character. They are all of the same nature as those of the affected area of the cornea, but are more numerous and the relative frequency is here different, the cells having large, pale, oval nuclei, and the leukocytes generally prevail. Plasma cells are also more often seen than in the cornea.

Behind the affected area more numerous nuclei are seen than in the balance of the cornea. The posterior surface of the cornea bulges somewhat toward the anterior chamber and shows undulations. These are due to wrinkling of Descemet's membrane which forms archlike projections into the chamber. There is no break in Descemet's membrane. These arch formations seem to be partly empty; partly they contain fine granular coagulum staining pink with eosin and partly some stratified tissue rich in nuclei, resembling the adjoining cornea.

Over the central part of the cornea, the endothelial cells are almost entirely missing; an occasional cell on the posterior surface of Descemet's membrane cannot positively be identified as such and resembles more a lymphoid cell. Only near the angles of the chamber are the endothelial cells forming a continuous layer, but are even here fewer than in the normal eye.

The anterior chamber is about 1 mm. deep in the center. The angle is perfectly free in most sections and the structures surrounding it are almost normal; in a few sections, a peripheral adhesion of the iris to the cornea measuring about 0.4 mm. is seen. The anterior chamber contains only a slight amount of granular, pinkish staining coagulum containing a few cells of lymphoid character.

A small focus of lymphoid cell infiltration is found in the iris root and a similar one near the sphincter. A small, broken-up posterior synechia exists in the pupillary margin. Ciliary body, choroid and

the other structures show nothing of interest. There is no glaucomatous cup.

NATURE OF THESE CASES.

From the description, it is quite clear that Case 2, showed the characteristic symptoms of corneal burns, not the subject of this paper, such as loosening and desquamation of the conjunctival epithelium, failure of the corneal epithelium to adhere, etc., together with a condition in the cornea, having all the histologic characteristics of a granuloma, which had developed in the anterior layer and on the surface near the center as a result of the destruction of the corneal tissue by lime. The clinical course of the first case makes, it almost certain, in spite of the lacking histologic examination, that here also the growths were pure granulomas. These, tho ultimately situated on the cornea, had their beginning in the conjunctiva of the eyeball near the limbus. With the advancing clearing of the necrotic area, the granulomas advanced more toward the center of the cornea, shrinking in the periphery on account of the scar formation at the rear, until ultimately all the remaining granulomatous tissue was choked off by the scar formation and the accompanying reduction of the blood supply.

A search of the literature for cases of true granuloma of the cornea will have to exclude at the outset the formations of granuloma tissue as the result of tuberculosis and leprosy. These cases undoubtedly belong to a different class, as is already evidenced by the etiology. One cannot positively class with these cases Bock's reports of granuloma following parenchymatous keratitis, on account of our present view concerning syphilitic parenchymatous keratitis.

TYPES OF GRANULOMAS.

If we thus limit ourselves to the pure granulomas of the cornea, it is for practical reasons advisable to divide them into the following three groups:

1. Granuloma in the region of the cornea, the result of a prolapse of the iris following perforation; this might properly be called granuloma of the *pseudocornea.*

2. Granuloma of the cornea extending from the conjunctiva of the eyeball near the limbus after injuries, etc.; granuloma of the *sclerocornea.*

3. Granuloma of the cornea, developing away from the limbus and not the result of perforation; granuloma of the cornea proper.

1. It is evident that the cases of our first group cannot be classed as granulomas of the cornea, but they are here considered for purely external reasons only. While not very frequent, they are more often to be observed than the other two forms of granuloma. In our second case, a superficial examination gave one the impression of a granuloma of this kind, as depicted by Parsons, Fig. 103. In Blaskovics' case, to be mentioned later, this possibility was also considered. In this group belong the two cases of Sichel, his observations 205 and 206, since perforation of the cornea had occurred in both instances. The case of Schmidt-Rimpler was probably of the same kind. His patient, a young laborer, after getting lime in both eyes, had paracentesis done on the right cornea on account of hypopyon. After nine months the right cornea was entirely opaque, everywhere traversed by blood vessels and showing a thick button of granulation tissue.

Schaeche's case of a boy who developed panophthalmitis with perforation, after mortar injury six months before, also belongs here. Large, mushroom-like granulomas formed at the point of perforation.

The case represented by Pagenstecher and Genth on their Plate 12, Figures 3 and 5, may possibly be classed here.

Lawson's case of a cicatrix horn growing from the cornea, seems to be an unusual form of granulation tissue formation developing after corneal perforation.

2. Of the granulomas belonging in Groups 2 and 3 of the foregoing classifications, the textbooks make no mention whatsoever. The American Encyclopedia of Ophthalmology contains

only meager reference to these conditions on pages 3436 and 5631. A good description by Wintersteiner with enumeration of the cases reported is found in the German Encyclopedia and may be repeated here: "As granulomas of the cornea have been described some few reddish, soft tissue-granulations growing to pea size which later become pedunculated and regressing and which developed after an ulcer, an injury, or a chronic inflammation." No mention of the condition is made in the French Encyclopedia.

The only other references to granuloma of the sclerocorneal type in the available American literature are found when Weeks, discussing granuloma pyogenicum of the lids, wonders whether the so-called granuloma of the cornea or of the sclerocorneal margin is not akin to it. The granuloma of the cornea has a tendency to recur, he says. He has examined two sclerocorneal tumors. In the same discussion, Jackson mentions a case of granuloma at the margin of the cornea, in existence six to eight weeks, having a purplish red surface; the edges reminded one of an epithelioma, but were perfectly soft.

In the discussion of burns of the eyeball by lime, Lewin and Guillery mention the following cases in which the granuloma formation began in the conjunctiva of the eyeball and advanced onto the cornea. (1) The cornea of a mason's helper, after mortar had splashed into his left eye, became covered with granulation tissue, reaching from the limbus almost to the center altho no ulceration had developed. (2) The case of Desmarres of a mason whose cornea after he had fallen into a lime pit became covered with a sarcomatous growth. (3) After getting lime into the right eye twenty-five days before, a boy showed mulberry excresences on the swollen conjunctiva and the vascularized limbus. Two months later, the excrescences covered the whole cornea. After three months, only a small point of the cornea was clear and the remainder was covered by an enormous granulomatous mass pedunculated at the base. (4) Gosart's case of a fleshy pterygium which partially covered the cornea.

In this group also belongs, without doubt, our first case.

Beierle reports a case belonging in this group of hypertrophy of the conjunctiva and granuloma on the otherwise intact cornea of a dog. He assumes injury of the cornea.

3. The most interesting group is formed by those cases in which the granuloma unquestionably originated in the cornea itself, away from the limbus, and did not follow perforation—only resulting from a destruction of corneal tissue, with or without the formation of an ulcer. It is for these cases alone for which the term granuloma of the cornea should be reserved. Search of the available literature discloses only the following cases.

Blaskovics' patient, a woman, aged 25, had recurrent eye inflammation with photophobia when a child. When 8 years old, she received an injury to the right eye and a white spot in the center of the cornea resulted from it. Four years before she came under observation, a red area appeared in the center of the spot and increased gradually. When seen by Blaskovics, the tumor was 10 by 11 mm. in diameter, 1 mm. thick, yellowish red and soft, its surface irregular. Granuloma from an iris prolapse was considered a possibility, but tumor of the cornea finally diagnosed. The examination of the enucleated eye revealed no bacteria. The cornea showed absence of the superficial layers in the center. The deeper layers were loosened. Near the growth the cornea was infiltrated with round cells and numerous vessels extended into it from the conjunctiva. Bowman's membrane was absent in the whole extent of the growth. A 1 mm. band of unaffected cornea extended all around the growth. It was divided by connective tissue septums, forming wide meshes. These contained homogeneous intercellular substance with small round cells, and the nuclei were often in mitosis. He considers it a case of typical granuloma of the cornea.

Blaskovics also quotes as true granu-

loma the three cases of Bock. In his first publication, Bock relates two cases of granuloma formation of the cornea among ninety-two cases of parenchymatous keratitis. The masses disappeared gradually and left dense opacities. His third case was that of a boy, aged 13, who had had parenchymatous keratitis of the right eye some time before and on whose left eye a growth developed during the four weeks previous to consultation. In the center of the opaque cornea, which showed deep vessels, a growth of 3 mm. was visible. It increased rapidly during the two weeks of observation and became constricted at the base. The excised growth showed the picture of a wound granuloma. Its pedicle was covered with one layer of epithelium. The condition is looked upon as the result of a circumscribed excessive accumulation of lymphoid cells which after breaking thru the lamellae in front of it, could grow unhindered. These cases are not mentioned in Lagrange's excellent work.

The case of Pagenstecher and Genth on their Plate 12, Figures 1 and 2, is an undoubted case of pure granuloma of the cornea proper, tho some misunderstanding has been created in the literature about it, owing to the use of the word sarcoma in the English translation of the German text. Its granulomatous character is also maintained by Lagrange and by Gayet, whom he quotes.

The granuloma in Raabe's case developed at the seat of a healing septic ulcer of the cornea which had been cauterized. The histologic examination showed granulation tissue.

Hirschberg and Ginsberg describe a large, prominent, coxcomb-like, grayish-red granulomatous tumor on the cornea of a girl of 9 having tuberculosis. The tumor showed granulation tissue with numerous leukocytes and areas of myxomatous tissue. It was not covered by epithelium.

A vascular pedunculated growth, developing rapidly after injury, was reported by Bargeton and thought to be possibly a sarcoma, but histologic examination confirmed the clinical diagnosis of botryomycosis. A similar diagnosis was made by Reihaus whose patient, a woman of 46, had much eye inflammation when a child, and whose left cornea showed a small white tumor beginning at the lower margin and extending into the pupillary area. The histologic examination of the excised tumor revealed it possibly to be the product of proliferating inflammation and certain small bodies found are interpreted as "hefa." Axenfeld, reviewing these two cases, says, "There is no proof that any of the cases were any different from what have been described in the literature as granulomas. Further investigation is necessary to determine the pathogenesis of these growths."

Our Case 2 agrees in all histologic essentials with the cases of Blaskovics, Bock, Pagenstecher and Genth, Raabe, Hirschberg and Ginsberg, etc., and is therefore, one of a pure granuloma of the cornea, of which histologic examination could be made.

Bajardi reports a pedunculated granuloma on the cornea of a rabbit, probably resulting from an ulcer. It was covered with epithelium. Gay found a pea-sized tumor on the cornea of a bitch, consisting of a granulation tissue.

It does not seem quite certain that the case of Adler is really a case of granulomas of the cornea although apparently classed as such by Lagrange. Strangely enough, this case does not seem to be reviewed in the contemporaneous German literature. A railroad employee, suffering from gradual diminution of sight with moderate local inflammation of the eyes for two years, showed gray, gelatinous granulations on each cornea, eighteen on the left and fewer on the right eye. The histologic examination revealed them to be a kind of miliary granuloma, consisting of corneal tissue covered by an epithelium much thicker than normal and suggesting those fibrous formations one sees especially on serous membranes following chronic inflammation. But in view of the peculiar histologic findings the bilateral arrangement. the multiplicity of the growths.

and finally because of the occupation of the patient it might be pardonable to think that the condition of each cornea was nothing else but a kind of hypertrophy of the corneal epithelium, as seen at times after recurring irritation, produced in this case by repeated foreign body injuries.

A number of cases are recorded in the literature under different names, such as fibroma, myxoma, sarcoma, etc., in which the condition described can without undue force be explained as some result of granuloma formation of the cornea either showing greater development of fibrous tissue, or showing changes of a myxomatous nature, etc. Some of them are undoubtedly only changes in a pseudocornea following perforation or destruction of the cornea. As such may be classed the cases of H. Adler, Benson Cases 1 and 2, Capellini, Falchi, Gallenga, Mitvalsky, Polignani, Qualino and Guaita, Rogman, Rumschewitsch, cases 1 and 2, Scott and Story, Silex, Simon, Szokalski, Zirm, etc. In this connection Parsons (264, 265) remarks: "No sharp line can be drawn between purely inflammatory conditions and many so-called growths . . . As to the embryonic spindle-celled type of sarcoma, it may be doubted whether some of them are not simple granulomata (granulation tissue)." Similar opinions are voiced by Lagrange, Blaskovics and Wintersteiner.

It is difficult to say where Stellwag's case is to be placed. The histologic examination, tho quite insufficient for classification, is not of such a character as to exclude the possibility of a granulomatous origin.

ETIOLOGY.

In connection with the question of etiology, one will have to consider two points: (1) Under what condition does granuloma arise in tissues and especially in the cornea? (2) Why did the destruction of corneal substance not lead to any secondary infection but only to the formation of granulomas?

On this point, Mallory says, "Healing by granulation is the repair of wounds where there is more or less loss of tissue which has to be filled in by new formation of cells. The injury is often excessive, much foreign material has to be removed."

It is interesting how well this description applies to all cases of granuloma of the cornea in which a good history of the origin exists. Burns of the cornea by lime or other chemicals will be followed by necrosis and the necrotic material will have to be cast off before repair can set in. The same thing will apply to destruction of the cornea by ulcers, vesicle formation, etc. If the corneal tissue has been destroyed by an inflammatory process, such as in parenchymatous keratitis, it need not lead to any loss of substance on the surface, resulting in an ulcer; the process of removal of the necrotic material and the details of repair will be essentially the same, and may, therefore, lead to granuloma formation. It is more difficult to explain how these cases with their long standing necrotic ulceration escape secondary infection and rapid destruction of the remaining cornea. It may possibly have to be ascribed only to a fortunate circumstance that the ever present pathogenic microorganism did not enter the tissues. After vascularization has taken place in the cornea, and even more so after the granulation tissue has begun to develop, the cornea becomes more proof against the attacks of bacteria. In this connection, it is interesting to remember the remarks of Weeks and Axenfeld quoted in the foregoing.

TREATMENT.

In the treatment of these cases, it will be good to bear in mind the continued danger of infection and therefore to limit one's self to as little manipulation as possible. Abscission of the granuloma may not be advisable, in view of the several reports of their recurrence, and especially so because such action may open an avenue for infection. It is best to await the absorption of the granuloma in consequence of the scar formation and the accompanying reduction of the blood supply. This plan was carried out in the first case reported.

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OPHTHALMO-THERAPEUTIC IGNORANCE REGARDING OPTIC ATROPHIES.

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NEW YORK.

This report is of a collective investigation regarding the current treatment of optic nerve atrophies among American ophthalmologists.

During the past few years the therapeutics of neurosyphilis has been enriched by the addition of one new drug and a new method of medication: salvarsan and intraspinal or intracranial injections.

Knowing the disappointing results obtained by ophthalmologists by their old routine method (mercury, iodids and strychnin), in treating syphilitic optic atrophies I made the attempt a few years ago to obtain a general idea about their experience and attitude regarding the treatment of this condition since the introduction of the salvarsan and spinal medication. I sent letters* of inquiry to several hundred

*With this occasion I wish to express my thanks for their frank and prompt reply. I am fully aware of the fact that we have to be very cautious in drawing conclusions from replies coming from an extreme variety of sources. But nobody can deny that an investigation of this sort shows us the general consensus of opinion and gives us a fair idea of how little 200 of the foremost men engaged in this specialty feel that they can accomplish with the present means of treating atrophic conditions of luetic nature of the visual pathways.

colleagues and received over 200 replies from ophthalmologists of large experience from all over the country.

(1) Are you obtaining better results in the treatment of progressive optic atrophy of luetic nature since the addition of salvarsan to our therapeutics?

To this question 56 ophthalmologists answered that they never used salvarsan; 106, that the results are worse or indifferent; 24 regard with favor the use of intravenous injections of salvarsan, but add that their experience is very limited.

(2) Do you use intraspinal injections in luetic atrophies? What results?

To this question 139 answered that they never used spinal injections; 4, that their experience is too limited to give any opinion; 23, that they have used this method with no success; 17 have used the spinal treatment in 1 or 2 cases and were favorably impressed.

As we see, the majority was unfavorably inclined towards the intravenous administration of salvarsan. As for the spinal treatment the state of affairs is still gloomier: The method had not even been given a trial by most ophthalmologists.

This investigation will surely raise in the minds of the readers a number of objections and comments. Nothing can be answered to the objection (if they have any) of those who never tried salvarsan under any form or method. No definite conclusion can be drawn even from the statement of those who say that the results (in cases treated by intravenous salvarsan injections) are indifferent or bad, because: (a) In the replies received the confusion is frequently made between the neuritic and taboparetic type of optic atrophies; (b) Nothing is mentioned about the dosage and total amount of salvarsan, frequency of administration, duration of treatment, etc. Many have given up the treatment after 1 or 2 injections, which does not prove anything.

Regarding the lack of experience with the intraspinal treatment of 143 out of 183 ophthalmologists we have the impression that it is due to the fact that this method is considered by our confréres either very difficult, dangerous or ineffective. The question of efficacy of spinal treatment and intravenous injections of salvarsan will be discussed more fully in another paper. The statement of those who have used the spinal treatment without beneficial results cannot be accepted as first class evidence, because we are not furnished with results regarding the condition of the patients and how systematically the treatment had been carried out.

The writer knows of cases which have been given up because one or two spinal injections have failed to improve the vision, or because vision continued to fail after the first injection. These cases and such treatment do not prove anything. An arrest of the process causing the failing vision or even an improvement should be expected only after a systematic course of 6 to 12 or more spinal treatments have been administered, combined with a general cautious but persistent antiluetic treatment. It is superfluous to add that the technic of spinal puncture is not very difficult, nor is it dangerous if done with care. The tens of thousands of spinal punctures done with impunity in this country and abroad prove my contention.

Among the questions and suggestions contained in the replies to my circular letter the following ones deserve to be mentioned:

1. Many ophthalmologists are of the opinion that salvarsan acts injuriously upon the optic nerves which are in the process of atrophy; others believe to the contrary, that it is more injurious in nonluetic atrophies; and still others think that salvarsan may cause atrophy in perfectly intact optic nerves. Since these opinions are in part based on hearsay and in part upon a *post hoc propter hoc* occurrence, we have no right to accept them as facts. Time and accurate observations will clear up this point. To those who have used a great deal of salvarsan in syphilis of the central nervous system one thing is clear, namely, that it is *not* injurious to the healthy or damaged optic nerves, if

administered in proper doses and at proper intervals.

2. Some express their belief that the drug is beneficial only in incipient cases of optic atrophies. Experience shows that this is true only in some cases. I have seen patients with a moderately advanced optic atrophy greatly benefited by spinal and general treatment.

3. Some, notwithstanding the numerous reports in neurologic literature, consider the spinal treatment as a dangerous procedure. My own experience is opposite to their belief. I have never seen one single case in which I had reason to regret the use of the spinal method of treatment, and Dr. I. Rosen, Chief of the Department of Syphilis of the Vanderbilt Clinic, who has given several thousands of injections, never had a single accident.

4. A few gentlemen from Philadelphia have based their doubts on the value of salvarsan in optic atrophies upon the supposition, almost universally accepted, that the drug is a spirochetecide and not an antidegenerative. While this objection seems to be quite right, we must not forget that there is still a possibility that the action of salvarsan may not be directed only upon the spirochetae, but may (as I think very probable), act upon the tissues as a stimulant as well. Furthermore, it is a fact that there are cases of optic atrophies in which the process was arrested by the systematic and judicious treatment with salvarsan and mercury.

5. How much should we fear a Herxheimer reaction while treating lues of the optic nerves, is a question brought up by a few colleagues. A very well known and highly reputed ophthalmologist does not use the salvarsan on account of a possibility of setting up a reaction in the optic nerves of sufficient intensity to cause a permanent damage to the nerve fibers. This fear, very current at the beginning of the salvarsan era, has gradually subsided now, when we use much smaller initial doses preceded by Hg. intramuscularly.

6. One colleague calls my attention to the fact that in some patients with chronic or latent nasal sinusitis the condition may become acute under the influence of salvarsan; and thus act upon the optic nerves—a sort of Herxheimer reaction in the nasal sinuses.

7. Finally, a large number of ophthalmologists, many of them among our leaders, flatly declare that their experience with the treatment of luetic optic atrophy is limited, because they refer their cases, where they belong; some to neurologists, others to syphilographers. It is undoubtedly correct to have the patient examined by a trained neurologist, because the patient has, most of the time, syphilis of the entire central nervous system, not only of the optic pathways. It is probably advisable to put the patient in the hands of a syphilographer experienced in the treatment of neurosyphilis; but it is unfortunate to throw him overboard and let the neurologist or syphilographer take entire charge of him. We have only to read up the reports on cases of neurosyphilis with eye manifestations, and, no matter who the author is (be he a leading syphilographer or neurologist), we will be surprised by the lack of completeness of and interest in the ophthalmologic phase of these reports.

Reliable ophthalmoscopic examinations, fields of vision, measuring of the acuity of vision, etc., can be made only by ophthalmologists; their special interest in the visual organ makes them more fit to judge of the progress obtained and more concerned about the outcome of the entire case. I should consider as ideal to have the ophthalmologist administer the treatment, and have the neurologist and syphilographer act only in advisory capacity. This would give him more experience on the neurologic end of the subject, and would stimulate him to try again to find a better way of treating syphilitic involvement of the optic pathways.

THE DETERMINATION OF DEVIATION IN SQUINT BY THE PRIESTLEY SMITH METHOD, WITH A MODIFICATION TO INSURE GREATER ACCURACY.

WILLIAM F. HOLZER, M. D.

WORCESTER, MASS.

This paper written while its author was interne at Wills Eye Hospital, Philadelphia, describes in detail the Priestley Smith method of measuring squint, with a modification to insure greater accuracy.

The angular method of measuring the deviation in cases of concomitant squint with the Priestley Smith tape does not commend itself as highly as it should, if one may judge from the descriptions usually given in our text books. In most books the tape method is briefly dismissed, oft times with a foot note, or goes unmentioned. Some of the descriptions present a vagueness in the method of its application, neglect to name length of tape or define gradations; and some present contradictions as to position of corneal images.

A very important and yet often neglected step in the estimation of a squint is a regard for the angle gamma, or angle kappa of Landolt. The Priestley Smith tape method as described by Worth[1] accounts for the angle, without the necessary separate determination, and addition if positive to convergent and deduction from divergent squints; and vice versa if negative. Worth says in part: "The patient is first told to fix the mirror, while the light of a lamp is reflected into the fixing eye. The position of the image of the mirror, on the cornea of the fixing eye, is noted. The light from the mirror is now thrown on to the deviating eye, and the patient is directed to look at the surgeon's tape hand. This is moved horizontally, till the position of the image of the mirror on the cornea of the squinting eye, is similar to that which it formerly occupied on the cornea of the fixing eye." (Corresponding to the visual axis of the eye.) Practically every other description of the method of application directs the image of the mirror to be placed in the centre of the cornea, which corresponds to the optic axis of the eye; thereby disregarding the angle gamma.

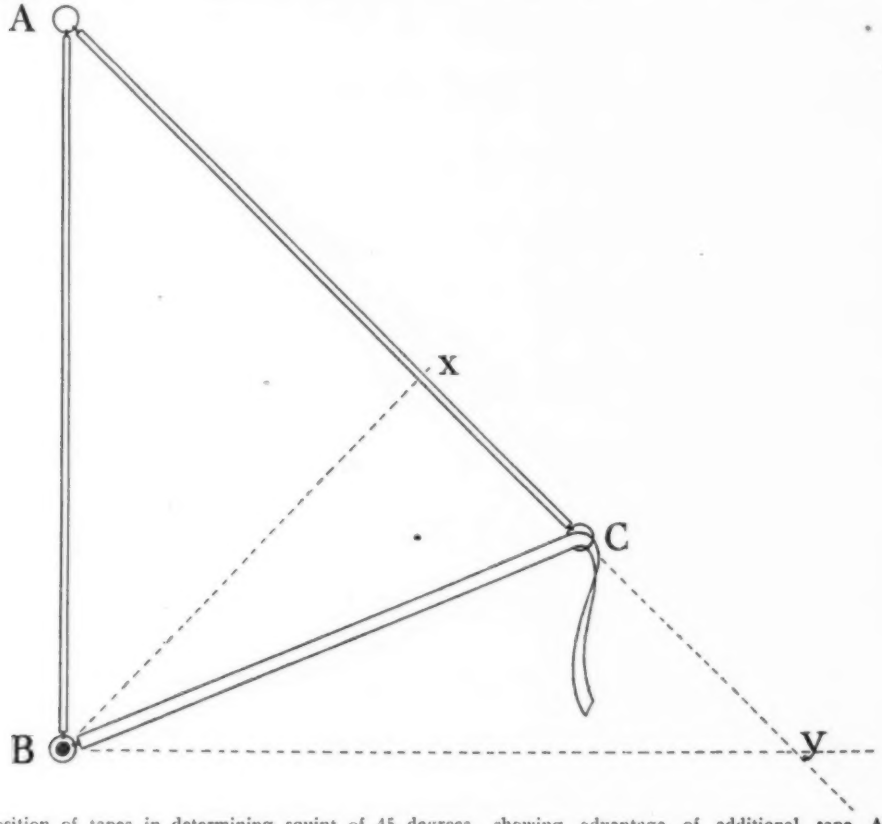
Two criticisms are apt to arise; first, the diviation when fixing at six metres compared with fixing at one metre or at sixty centimetres (length of the later tape); and, second, the error due to measurement on the chord of the arc as compared with measurement on the arc. Maxwell[2] demonstrated that the angle measured at twenty-five centimetres (less than the length of the tape) averaged 2.1 degrees greater than at six metres. The "mathematical error" (the difference between an angle measured on the arc of a circle and the chord of the arc) is so small as to be practically negligible. On the other hand the "observation error" (the inability of the observer to place exactly in a corresponding situation on the deviating eye the position, centric or eccentric of the corneal image in the fixing eye) is common to most methods of measuring deviations, the degree of accuracy depending upon the skill of the individual observer.

The writer has made a slight addition to the Priestley Smith tape, very simple but which he deems quite important; never having seen it noted. It is the addition of a "constant radius," by means of a tape from the ring, held by the patient against the cheek, to the hand of the observer which slides along the graduated tape, maintaining a constant radius.

A cloth or steel tape graduated in centimetres, two pieces of half-inch cloth tape, measuring with rings attached sixty centimetres, and three one-inch steel or nickel rings, one to three sixteenths of an inch thick, constitute the necessary materials for the tape.

The accompanying diagram illustrates the position of the tape in the measurement of a concomitant squint of 45 degrees. To A (ring held by pa-

tient against cheek) is attached tape A B and ring B (thru which ophthalmoscope handle is placed). B C represents the tape graduated in centimetres (1 cm. = 1 degree) attached to ring B and passed thru ring C. The tape A C is the writer's addition. Being the same length as A B it maintains a constant radius as the hand slides along the graduated tape passing thru ring C. B C represents the chord of an arc of a circle whose radii are A B and A C.



Position of tapes in determining squint of 45 degrees, showing advantage of additional tape AC (Holzer); which prevents errors from holding tape BC too near patient (X) or too far away (Y).

The determination of deviation is made by the Priestley Smith[3] method. Let us take for example a convergent squint of the left eye. Measurements should be made in a dark room with a lamp situated behind the patient. The ring A is held against the right cheek below the fixing eye by the patient. An ophthalmoscope or retinoscope handle is passed thru ring B and held in the observer's left hand. The image of the light behind the patient is now reflected from the mirror of the ophthalmoscope or retinoscope into the fixing eye, and the patient is directed to fix the mirror. Thru the sight-hole in the mirror the observer notes the exact position of the corneal image. He now turns the mirror to the left eye; the patient still fixing the mirror with the right eye, and notes that the image on the left cornea is situated eccentrically outwards, showing that this eye deviates inwards. He now directs the patient to follow, with his fixing eye, a finger of the observer's right hand over which ring C has been placed. The right hand is gradually moved horizontally outwards along the tape B C while the observer notes the changing position of the corneal image thru the sight-hole of the mirror, until

the left eye has rotated outwards enough to bring the image to the *corresponding situation* occupied in the fellow eye (right) when that eye was fixing the mirror. When this point is reached he pinches the tape and reads off the degree of deviation; one centimeter on the tape equalling one degree of deviation.

The same position of the hands and tape can be employed in measuring a divergent squint of the right eye, with the left eye fixing. To measure a convergent squint of the right eye or a divergent squint of the left eye the principle is the same but the hands and tape are reversed. The tape can be held taut between the ring and the finger, obviating the necessity of the weight usually mentioned.

The diagram illustrates at a glance the "constant radius" maintained by the writer's additional tape A C. It presents graphically the advantage of the tape in avoiding errors by faulty position of the distal end (C) of the graduated tape B C. A reading made with the tape in the Bx position would be less than that made at B C, because the distance between the patient and the end of the tape at x is less than 60 cm. With the tape occupying the position By, the reading will be greater than that made at B C, since the distance from the patient and the distal end of the tape at y is greater than 60 cm.

This method is applicable to almost every case. Parsons[4] says: "This test is by far the best for small children of any yet devised." It is almost a purely objective test, accurate, rapid and simple. The tape is compact, portable and inexpensive.

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NOTES, CASES AND INSTRUMENTS

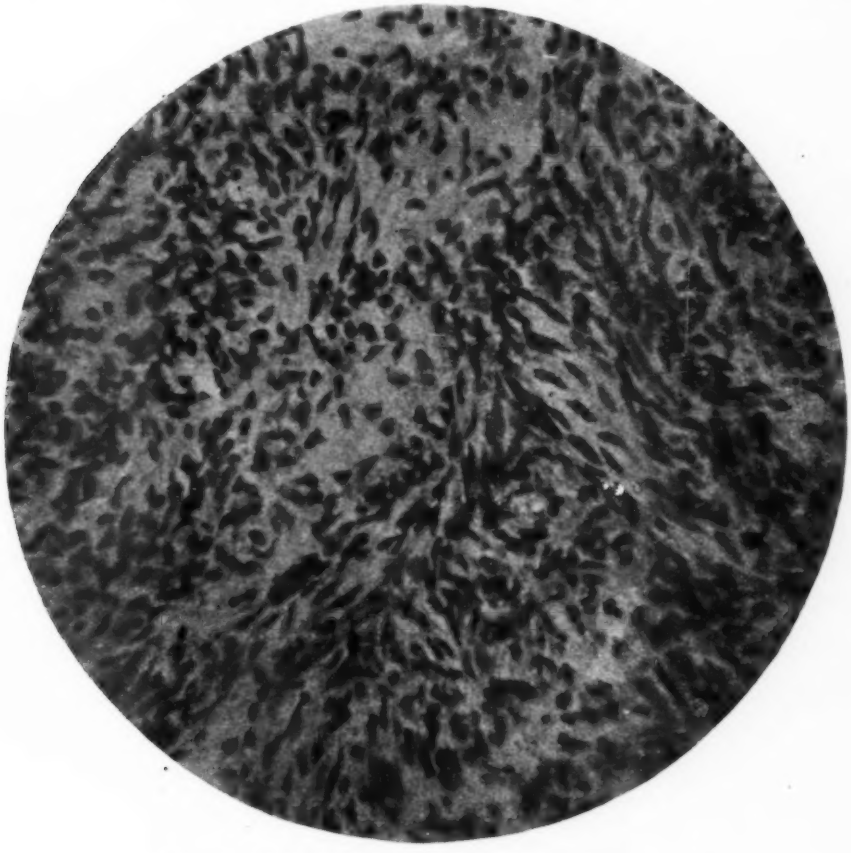
PRIMARY SARCOMA OF THE IRIS WITH REPORT OF A CASE.

HARRY FRIEDENWALD, M.D., F. A. C. S.

BALTIMORE, MD.

Primary sarcoma of the iris is of such rare occurrence as to warrant the publication of each individual case. According to Laven[1] about 130 were on record in 1913. The case which it is the desire of the writer to report has special interest because it belongs to the so-called leucosarcomata, and because its removal by iridectomy was followed by a satisfactory result during the period of observation of one and a half years.

The patient, Miss E., aged 40, was first examined by me in 1909. Her central vision was perfect. I prescribed glasses and noted that the eye-grounds were normal. I saw the patient again in 1915. In April, 1917, she again came for the examination of the refraction. I found vision perfect in both eyes. But on using the ophthalmoscope I noted slight distortion of the left pupil and on examining the iris with the loupe I observed a small pinkish mass protruding into the anterior chamber from the surface of the nasal part of the iris, about midway between the pupillary and the peripheral margins, and about 2 mm. in diameter.



Primary spindle-cell sarcoma of iris. (Friedenwald's case.)

The diagnosis of sarcoma was made. Dr. George E. de Schweinitz was con-

sulted on May 8, 1917, and he concurred in the diagnosis as well as in the recommendation that iridectomy was indicated. It should be stated that a blood Wasserman was negative.

The patient was operated on May 15, 1917. An incision was made with a von Graefe knife, was enlarged with scissors and a large piece of the iris was excised. The patient made a rapid recovery. There was a slight drop in vision. September 14, 1917, her vision was, Right eye +0.5 cyl. ax. 90°= 20/19, Left eye +0.5 cyl. ax. 90°= 20/38. The patient was last seen on December 12, 1918. The eye showed perfectly healthy conditions nineteen months after the excision of the growth.

The excised iris was given to Prof. Standish McCleary for examination. His report dated May 24, 1917, was that the growth was a spindle cell sarcoma, almost perfectly free from pigment. What little pigment was present was found at the extreme margin of the growth and may have been the pigment of the iris tissue.

The minute size of the growth and its satisfactory removal by iridectomy are of interest and prove that the growth was excised in an early stage. This is also in accord with the view that the nonpigmented sarcoma or so-called leucosarcoma,* of the uvea is an early stage of a growth which in its further development becomes pigmented. According to Schieck[2] the nonpigmented round-cell sarcoma represents the first stage, the nonpigmented spindle-cell sarcoma the second stage, the pigmented spindle-cell sarcoma the third stage. The case reported is therefore typical of the second stage of melanosarcoma of the iris.

*The term leucosarcoma as used by ophthalmologists to denote nonpigmented sarcoma should be discarded in view of the wholly different sense in which it is applied by pathologists. "This term, introduced by Sternberg, is meant to designate those cases in which a definite, tumor-like lymphoid mass is developed and is composed of lymphoid cells which seem to escape into the blood-stream giving rise to leukemic alterations of the blood." (MacCallum).

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THE STUBBORNNESS OF SOME CASES OF CONJUNCTIVITIS

By Dr. Juan Santos-Fernandez.

HAVANA, CUBA.

Since beginning my ophthalmic practice in Cuba, more than 40 years ago, I noticed some cases of conjunctivitis, almost always of a catarrhal nature, that resisted all efforts made to cure them, and did not end with the brevity and success of most cases. Sometimes they got much better and were almost on the point of being cured, when the disease regained new strength and caused the patient new troubles, especially when there was need of reading by artificial light. Many times I have been consulted by some patient who even with some pride let me know that he had consulted various physicians and ophthalmologists without having been cured.

Cases of this nature, as they did not mean any mysterious trouble, were almost sure to be included in the long list of "seen without results." I tried not to order the same drugs that had been prescribed for him before; but I was convinced that the failure did not lie in this drug or the other, because with them other patients were cured in 4 or 5 days.

We presumed that this stubbornness was due to a lack of observance of the most rudimentary hygienic principles, violated by even people that occupy the most exalted positions, without any desire to do so. This is due to the fact that one does not apply the same criterion and impartiality to his own troubles as to his neighbor's.

Sometimes by letting the patient talk all he wants we are able to establish a diagnosis, because the symptoms have been felt by himself and the physcian can direct himself to some extent by this. At other times the description misleads the physician because

the patient has a mistaken impression of his own troubles.

Generally the patient does not trust much to hygienic councils but wants something that will cure him quickly. Many patients would run away from medicine and doctors if they became persuaded that we, in many cases, only follow the cycle of a disease and that nothing can greatly shorten that cycle, much less stop it *ipso facto*. The physiologic process of the organs cannot be disturbed often without some untoward effects.

Going back to our original thesis, we have been surprised when a case of conjunctivitis that many times is cured with a simple zinc sulphat wash, for example, becomes so unyielding at other times to every drug used in ocular therapeutics, and this without any apparent reason.

In order to have a technical and definite understanding on this matter it is well to follow Hippocrates' recommendation of keeping a reflective observation of every case every day, and by making an examination of the etiologic factors of conjunctivitis in general and especially of the catarrhal cases. We shall lay aside the diphtheritic and the gonococcic types and limit ourselves to the group of so-called simple conjunctivitis, when we are not able to determine its cause, or catarrhal when the symptoms may give rise to some suspicions of incipient trachoma. This is chiefly suspected when after some days of treatment the symptoms do not disappear.

It is known that the conjunctiva is in contact with the air so full of germs, and that the microbian host normally in the eyes is great, while local or general alterations may exalt their virulence and cause a catarrh or any other conjunctivitis.

When the astringent action of the collyria is sufficient to abolish the conjunctival injection or has a bactericidal action of enough strength to counteract the action of the germs described, generally a case of conjunctivitis can be cured in a few days if the ophthalmologist himself (or a trained nurse) is the one that instills several times a day the antiseptic solution used, placing it well inside of the everted *cul-de-sac* of the superior fornix. This generally cannot be done by the patient or his relatives, because the germs lodged in the retrotarsal folds cannot be reached by the simple dropping of some solution inside the lower eyelid. Many patients that do not even wash out the secretion lying upon the lids, this lasting for many hours, and the solutions ordered being applied by unskilled people, it is no wonder that the conjunctivitis develops freely and only ceases after the disease has run its entire cycle and if there have been no complications.

By having the treatment given by the ophthalmologist or some trained assistant as often as required by the virulence of the germ, all this can be avoided. But as it would be impossible for the surgeon to go himself several times a day to the patient's home, the best thing for the patient would be to stay for several hours, or come several times a day to the office, or go to a clinic or hospital where the proper attendance can be had.

After the chief bacteriologic facts of modern science have been known it is easy to see how frequently contagion and infection may occur and how long a conjunctivitis may last, if the proper hygienic rules are not followed closely, and the eye of the patient is seriously endangered by that lack of hygienic principles.

By following this rule we have been able generally to cure stubborn cases that had resisted treatment, sometimes for more than 4 months, thus clearing up suspected cases of trachoma. We have frequently maintained true trachoma can be relieved and often greatly so, but it never can be cured until its three full stages are run.

In short we are of the opinion that conjunctivitis, like keratitis and other ocular affections, has a long course and complications because the patients believe that they can be cured with a simple prescription. This is not always sufficient and there is need of a constant inspection and proper treatment directed personally by the ophthalmol-

ogist, or his assistants, in order to know when to modify the treatment and when to supply the same.

Taking all things into consideration it is really surprising that more cases are not lost, due to the carelessness in following the most rudimentary hygienic rules and to the unskilled administration of drugs by nonexpert hands.

SOCIETY PROCEEDINGS

COLORADO OPHTHALMOLOGICAL SOCIETY

April 4, 1919.

Dr. F. R. Spencer, Presiding.

Ectopia Lentis.

D. A. Strickler, Denver, presented four cases of ectopia lentis in the same family. They were the mother and three children, and there was a fourth child which was said to have the same defect. The mother was forty-eight years of age, and had noted defective vision from early childhood. There was no history of unusual eye trouble in the ascendants. Both lenses were cataractous and lay almost horizontally in the vitreous. The vision of the right eye with +4. sphere was 20/200, of the left eye with +9 sphere 20/40. A daughter aged eighteen years had been pronounced normal at three years of age by a former Denver oculist. It was thought that the dislocated lenses were first diagnosed at the age of nine years. The vision was R. 20/200 with —14 sphere, L. 20/70 with —16 sphere. The lenses were both displaced downward and outward, altho not extremely. A boy aged fourteen years was said to have had dislocated lenses at six months of age. The vision was R. 20/70 and L. 20/100 with +3 sphere. The upper margin of the right lens was at the center of the pupil, whereas the left lens was only moderately displaced downwards. The case not shown was in the oldest child, a girl of twenty-one years. There were no other children. Double vision was not noticed in any of the cases.

Discussion. G. F. Libby, Denver, thought that there must be an hereditary factor in these cases.

Edward Jackson, Denver, had successfully needled such a lens. These lenses are of course always more movable than the normal, and it is difficult to make much impression on them with a needle. The lens always shows a marked tendency to heal up unless a decided cut is made. He had extracted such lenses, but a good many more he had simply let alone, giving the patient the best correction possible. If the lens is thoroly across the pupil one has to correct the high myopia, whereas if much of the pupil is free from the presence of the lens one has to correct for the aphakia.

F. R. Spencer, Boulder, referred to a case of his own in which there had been so much dislocation as to amount to a practical aphakia, so that very good vision was had with a high plus sphere.

E. R. Neeper, Colorado Springs. The difficulty of needling can be obviated by needling from the point of traction, and the desired effect can also be more readily obtained by using and rotating a short bladed knife.

Atypical Phlyctenular Conjunctivitis.

D. A. Strickler, Denver, presented a man aged thirty years who since November, 1918, had suffered in his right eye from a condition more or less resembling phlyctenular conjunctivitis. Redness and pain had first come on after driving in the wind, and the first attack had cleared up in a week under atropin. The trouble reappeared after about ten days. There was at present a bleb at the upper outer margin of the cornea, approached by a typical fan of vessels. The urine contained blood, and more albumin than was accounted for by the blood, but the microscopic findings were negative. The

nasal condition was apparently normal. The pain was so severe that the patient had had sleepless nights on account of it. The teeth had been x-rayed and one had been removed. Dr. Strickler leaned to the belief that the condition was of tuberculous origin.

Discussion. W. C. Bane, Denver, suggested the possibility of a minute body being carried on the eyeball.

W. C. Finnoff, Denver, had seen the patient two weeks previously at the clinic, and stated that at that time the eye was free from irritation. Moreover the left eye had also been involved.

Edward Jackson, Denver, thought that the left optic disc had a decidedly swollen appearance, and was inclined to suspect the sphenoidal sinus until it had been eliminated. The hematuria looked like tuberculosis.

G. F. Libby, Denver, referred to a case of optic neuritis which he had reported at the December meeting as cured, and in which cleaning out the sphenoidal sinus had cleared up the eye condition with recovery of vision.

W. C. Bane, Denver, spoke of a case in which Dr. Claude Cooper of Denver, in operating upon a nasal case, came across what he supposed to be the optic nerve unprotected, in the sinus.

F. R. Spencer, Boulder, had under his care a case in which bilateral neuroretinitis was probably due to sphenoidal and ethmoidal disease. He also referred to another case seen in the army, in which the loss of vision was undoubtedly due to sphenoidal disease.

W. C. Finnoff, Denver, referred to a case seen with the army in London, England, in which the vision was lost but rapidly recovered after opening the sinuses.

O. M. Orendorff, Canon City, objected that most cases of eye involvement from sinus trouble were from posterior sinus disease, whereas this man was complaining of an anterior eye condition.

Optic Neuritis.

George F. Libby, Denver, made a supplementary report of the case which he had reported at the December 1918 meeting of this society (American Journal of Ophthalmology, February 1919, page 155). On February 10th the vision of the left eye fell suddenly to 5/10, and it remained so for eight days altho a coincident intestinal indigestion was relieved meanwhile. The patient was then referred to Dr. T. J. Gallaher, who found hyperplastic ethmoiditis with slight empyema of the left sphenoid. On February 20, Dr. Gallaher did complete exenteration of the anterior and posterior ethmoidal cells, cutting down the anterior wall of the left sphenoid, and leaving permanent, perfect drainage. On March 3rd the L. V. was 5/4 partly, and on April 16th, 5/4 fully. There were no visible changes in the optic disc during this relapse but toxic irritation of the nerve seemed a reasonable explanation of the lowered vision.

Disseminated Choroiditis.

George F. Libby, Denver, presented a man of forty years who stated that in the summer of 1906 the vision of the right eye had fallen to counting fingers only, that of the left becoming slightly reduced three months later. The patient came under the care of Dr. Alfred Wiener of New York City at this time. KI was given internally, mercurial ointment rubbed into the temples, and dionin instilled into the eye. The vision was restored to normal in one year and a half, and had remained so since. The fundus of each eye now showed the typical picture of disseminated choroiditis, and correction of a low amount of hyperopic astigmatism relieved symptoms of eye strain. There was no history of specific infection, and Dr. W. C. Mitchell had found the Wassermann reaction negative. The general physical condition was good and the patient wholly efficient in his occupation as a bookkeeper.

Discussion.—Edward Jackson, Denver. The appearance of the choroid is that of a syphilitic choroiditis and not of a tuberculous; there are so many smaller spots without areas of complete atrophy.

Dr. Libby (closing), thought that in the absence of definite specific manifestations, the patient, who had been pretty effectively treated according to the history, would be better let alone than scared by suggestion of further active treatment.

Iridodialysis.

W. C. BANE, Denver, presented a man of fifty-five years who had on March 13th been struck in the right eyeball with a leather tip which had flown off a whip with which he was striking his horse. Blindness was immediate, and the pain was very severe for about a day, but no attention was sought for the eye. Seen on March 18th, the iris was found to be detached at the upper outer margin over an extent of about 5 mm. There was blood in the anterior chamber. Vision was of the hand moving at one foot and the tension was reduced to 6 mm. of mercury. Under atropin in one per cent solution, a cantharides-collodion blister to the temporal region, and small doses of calomel and aspirin internally, the general condition of the eye had improved, and the vision had risen to 4/60.

Hemorrhagic Retinitis.

W. C. BANE, Denver, presented a man of sixty-nine years the fundus of whose right eye showed flame hemorrhages below and close to the optic disc, more numerous in the lower nasal than in the temporal quadrant. The disc was swollen and moderately choked. Examination of the urine had revealed nothing pathologic, and the blood pressure was reported normal. The left eye had been poor since childhood from an irregular corneal opacity.

DISCUSSION.—W. H. Crisp, Denver, suggested, as regards etiology, the presence of arteriosclerotic changes in the retinal vessels in the constricted portion of the optic nerve behind the disc.

Staphyloma Sclerae.

H. R. STILWILL, Denver, again showed the case of staphyloma sclerae from injury which he had brought before the society at its December meeting (see AMERICAN JOURNAL OF OPHTHALMOLOGY, 1919, page 153.) The lens was now cataractous, but the eye had been quiet since December. The patient had good light perception and projection.

Macular Choroiditis.

W. C. FINNOFF, Denver, presented a man of thirty-four years whose right vision had been failing for almost a month. He had had a bad cold while in France in February, but had been well since. A week ago he noticed a speck in the center of the right field of vision. He had frontal headaches which increased during the day, and the letters blurred and ran together when reading. The vision was R. 0.9, L. 1.2, not improved with lenses. The right visual field showed a small central scotoma. The Wassermann test was negative, as was also the urine. There was a yellowish area with some pigment disturbance about one-third the size of the disc, and oval in shape, just above the macula of the right eye. There had been some improvement in the condition since it was first seen three days previously. The patient's teeth were bad, and he had been advised to have them taken care of.

DISCUSSION.—Edward Jackson, Denver. It is difficult to ascribe etiology in this case, but the lesion is apparently subsiding; in other words, it is rather of an acute character.

Keratoglobus or Buphthalmus.

J. A. MCCAW, Denver, presented a case of congenital buphthalmus in an elderly man. The cornea was 15 mm. in diameter. The lens had been extracted from the left eye, and at the operation the cornea collapsed, falling down into the eyeball, and dropping back after it was lifted. There were six diopters of astigmatism in the cornea. The sclera did not appear to be enlarged, and there were no glaucomatous symptoms.

On behalf of J. W. Lehan, Greeley, the secretary presented a boy of eight or nine years who eighteen months or so previously had become almost completely blind in each eye. The history was

practically negative as regards kidney disease. The fundi presented only moderate changes, in the form of small scattered pigment deposits. The condition of the eyes had not appreciably changed for the past six months.

DISCUSSION.—Edward Jackson, Denver, suggested that a Wassermann test should be made. The boy still had his first set of front teeth, worn down to the gum and widely separated. The appearance of the fundus was suggestive of that sometimes seen in women after subsidence of a retinitis of pregnancy. The history and the appearance of the fundus did not suggest retinitis pigmentosa, but the condition was likely syphilitic. The pigment did not appear to be arranged especially around the retinal vessels, but undoubtedly there was a very general degeneration and atrophy of the retina.

WM. H. CRISP, Secretary.

CHICAGO OPHTHALMOLOGICAL SOCIETY.

April 21, 1919.

Vice-President DR. A. L. ADAMS, Jacksonville, Illinois, in the Chair.

Snydacker's Blepharoplasty in Morax' Clinic.

DR. E. F. SNYDACKER said that about fifteen years ago a girl came into his service at the Michael Reese Hospital frightfully burned. She was an epileptic; she had fallen onto a stove in a fit, and she had virtually fried the side of her face. From there she got into the Cook County Hospital, and he tried to remedy a severe ectropion of both the upper and lower lids by using Thiersch and Wolfe grafts. These grafts had taken, but were so degenerated and so shrunken that, if anything, they added to the hideousness of her appearance rather than benefited her.

When he saw her it was simply a problem of getting flaps because the injury was so severe, the burns were so deep and so adherent to the bone everywhere, that he realized it was impossible to correct the difficulty with grafts, so his object was to get skin that he could use for plastic purposes, and in looking her over carefully and studying the situation it seemed to him there was one place from which he could get the skin. She was literally fried from the top of the forehead right down to below the jaw, and the only skin he could see that was available was the skin of the neck, and he conceived the idea of taking a long flap, going down the neck.

This skin seemd to be loose and suitable for plastic skin, so he took a long flap, cutting it at an angle, and as the case was so deformed anyway, he had everything to gain and nothing to lose. He began at the angle of the jaw, cut diagonally a flap ten inches in length, turned it up to avoid kinking of the pedicle as much as possible. He laid this on a bridge of gutta percha, and covered the upper portion of the flap with gutta percha. He took a flap from the neck, turned it up, split in two the end with one part covering the upper lid, with the other the lower.

He left this flap in place seven or eight days, at the end of which time it was an easy matter to close the wounds in the neck. The skin was elastic and plastic. The deformity in the neck was largely concealed by the collar. At the end of seven or eight days he cut a bridge off which he did not need because he was able to cover the wound in the neck very easily. He simply cut that off at the time of the operation and was able to close the wound in the neck nicely. In cutting off this bridge he made use of only one suture to close the wound in the neck entirely, the rest of the wound had been closed at the time of the operation, and he found that he made a nice repair of what seemed to him an impossible situation. He showed this girl before a meeting of the Chicago Medical Society at the time and the result seemed a very nice one.

He had occasion, in fifteen years, to do this operation four times. One case was a severe case of lupus which had been treated by the X-ray, and in addition to the lupus she had frightful X-ray burns with great sloughing of the skin. She had lost the side of her

nose completely, so that the whole septum was exposed. There was a gapping wound beside the nose. The lower lid was entirely gone. This was another case where he needed a very large skin surface to repair this very extensive defect.

Again, he did the same operation. This time he made the flap a little more slanting; in fact, he had to make a little turn in the pedicle and he wished to avoid that this time. He also went a little lower because he became more bold. There was no danger of its sloughing if one followed certain basic principles. He went below the clavicle, turned the flap of skin up and was able to do a blepharoplasty and rhinoplasty with the same operation from the same flap. He made a lower lid and a new nose. The skin grew perfectly without trouble, and he again followed the method of cutting off the bridge.

In the third case there was a severe gangrenous sloughing following an automobile accident in a boy, who was dragged along the street.

The fourth case was a severe burn, not as severe as in the case of the girl who had epilepsy, but this time he believed the operation was feasible and should be done. It was done, and was not followed by any special deformity because the collar concealed the wound and the subsequent scar very well, so he went in rather boldly. The only case in which he did not get a satisfactory result was in the case of the automobile injury, and the reason he thought was because he operated too soon, while there was still some slough; and he had to do another operation to correct the partial failure.

He published this operation in the Archives of Ophthalmology, and later in the Klinische Monatsblätter für Augenheilkunde.

Morax took up the operation and modified it. He thought the first case that Morax operated was one of a very severe loss of tissue in a sloughing nevus, one of those large nevi that covered the face. He presented a picture showing the operation Morax performed. Morax made the operation, and instead of throwing away the bridge which the speaker cut off, and throwing away the portion he did not use, he conceived the idea that when he had taken a flap from the neck, he turned it up, covered a part of the defect or as much as he could in the first operation, then instead of cutting this part off, throwing it away, he waited until circulation was established; he left it a little longer than Dr. Snydacker did. He took the other part and turned that up and covered the rest of the defect with a portion of the skin which Dr. Snydacker had thrown away.

Morax had performed this operation seven times, and he also found that while it seemed a severe procedure and a daring one to take flaps ten, eleven or twelve inches long, it could be done with perfect impunity. If one followed certain basic principles there was no danger of losing any of the flap, and furthermore, the resulting defect was less than by taking flaps from places where they could not be concealed. Where one took a flap from the neck the collar would conceal practically the whole wound. One could take large defects and cover them perfectly with plastic skin well adapted for the purpose, and do this without materially adding to the difficulty.

Delmasso in Madrid performed the operation successfully, also a German named Fulchen. An assistant of Morax had published an inaugural dissertation on this operation which he had done in his clinic and also a resumé of the cases on which they had operated by this method.

No one claimed that such an operation should be done for slight defect. To remedy the ordinary ectropion one would not go down and take a long flap of skin to remedy a slight defect, and the speaker said he had never claimed that this operation was adapted for such purpose, nor did he expect it would be used for such a purpose.

What he did claim was this: It was an operation which replaced the old Italian method, the Tagliocozzi operation, anchoring the arm to the head; especially in rhinoplasty, where they

had to have a large skin surface, where they anchored the arm to the head for ten days, and made a bridge from the skin of the face or nose. The operation described was so much more practical, simpler and safer that it surely would in time displace that operation. This claim Morax had substantiated. It was a simpler operation to do than the old Italian operation. It was perfectly possible to do the operation without loss of flap which in a certain number of cases one was bound to lose in the Italian method; because where there was communication of the flap passing from the arm to the face, one was bound in a certain proportion of cases to have infection, no matter how carefully he protected the flap. One could not absolutely protect it.

If in making these flap operations one carefully measured the size of the defect that he wanted to cover and carefully marked out how far he wanted to go, and allow for a liberal shrinkage, say thirty to forty per cent, if one made the incision diagonally, following the sternocleidomastoid muscle, there was not much likelihood of a kink in the pedicle. If one would avoid kinking of the pedicle, if he was immaculately clean in his work, if the flap was made large enough so that there was no tension on it, it would take every time. There was no reason why a flap ten inches long should not take as well as one two inches long.

He thought the operation was better for rhinoplasty than for blepharoplasty, but one could combine the two as he had done in the lupus case. For these severe defects the operation was feasible and surely simpler and easier to do than the old Italian operation.

Discussion. — Dr. Dwight C. Orcutt asked Dr. Snydacker how he prepared the surface.

Dr. Snydacker replied that he made the ordinary preparation.

Dr. Orcutt asked whether he removed the skin of all the thickened tissues before he operated and how long before.

Dr. Snydacker said that it was necessary to dissect out all adhesions; that one had to put the lids on a stretch, and this was one of the hardest things to do. The lids ought to be sutured together for a number of weeks, six weeks was better than two or three weeks, but the longer one sutured the lids the better the result.

There was one difficulty in the operation he failed to speak about; one patient got a rather heavy upper lid; that is to say, the skin was a little heavy over the upper lid, and when one got thru there was a slight ptosis of the upper lid, but it was far better to have redundant heavy skin, and he would a good deal rather have ptosis than an ectropion which almost always recurred where one got too little. This was the difficulty in any flap operation on the upper lid, namely, that when one got thru he was apt to have a slight ptosis. There was no question that the Thiersch grafts in the first result gave nicer looking lids and better acting lids for the first few months. But any one who had seen much work done with Thiersch grafts knew where there were extensive defects, that in the end they shrank and degenerated and the result was unsatisfactory.

Dr. H. W. Woodruff, Joliet, Illinois, thought that the operation described by Dr. Snydacker would be very valuable in many of the severe cases that he spoke of. The speaker believed that ectropion of the upper lid could be repaired by the use of Thiersch grafts much more readily than the lower lid. In the lower lid one was more apt to have a return of the ectropion with Thiersch grafts but this did not apply to the same degree to the upper lid. The cases of destruction of the entire lid, both the conjunctiva and skin surfaces, would require something still further in order to make an eyelid.

The speaker saw something in the line of skin grafting in the work done by Dr. New in the Mayo Clinic which was exceedingly interesting. In repairing a nose Dr. New dissected a flap from the forehead, dissected the skin up, and put a Thiersch graft on the raw surface of the flap, so that he had a flap both surfaces of which were covered with epithelium. When the

graft had taken, he swung this down to make a nose, so that he had both the internal and external surfaces covered with epithelium. It occurred to the speaker that this same scheme could be adapted to restoring eyelids, where it was necessary; as where the entire structure of the lid, both conjunctiva and skin had been removed for malignant growths or lupus.

Dr. Oliver Tydings said the society was to be congratulated on having the privilege of listening to the description of the operation of Dr. Snydacker, which was scientifically conceived and brilliantly executed with beautiful results. As he understood, the condition for which the operation was performed was not one where all of both eyelids had been lost, but distorted remnants of all tissues except skin remained; the muscle was still intact if not in place.

Dr. Snydacker said it was not to replace the cartilage.

Dr. Tydings said it could not replace cartilage or muscle; that a globe left exposed by accident or disease would be in great danger.

Dr. Snydacker said that in the automobile case in which there was sloughing a strip of cartilage with a few hairs was adherent, and he had something to anchor the skin to.

Dr. Tydings asked what protected the cornea.

Dr. Snydacker replied that the cornea was not injured.

Dr. Tydings asked about the length of the exposure of the globe, especially the cornea to the drying influence of air.

Dr. Snydacker replied that there was no long exposure.

Dr. Tydings said that if the musculature was preserved one had a base on which to work. The main point in the handling of these cases with ectropion was to keep as far away from the bony surface of the orbit as possible and dissect as close to the ciliary region, being careful not to injure the follicles of the hair bulbs, and not to disturb scar tissue beneath, where it was adherent to the bone, because many of these cases were attendant upon fracture, as observed by the late Dr. Beard, and by keeping away from the orbital walls one could obtain better results.

With regard to the use of the Thiersch graft on the upper lid, he had never had a failure. He had always covered it well. He recalled one particular case of a young woman, the whole lid was everted, the ciliary margin attached to the upper orbital wall, the conjunctiva and tarsal cartilage everted, and presenting an unsightly mass. The condition was due to an abscess occurring in childhood. By dissecting close to the ciliary body and making as large a flap as he could, from above, dissecting the surface free and using a Thiersch graft he got a beautiful result. The only trouble was, it was in a colored woman and the skin he took from the inner side of the arm when exposed to the sun, turned black and looked as if painted. Ultimately it faded out and was not observable, or not as markedly as in the first place. He had never had occasion to employ the extensive grafts, but if he had he would follow the suggestion and work of Dr. Snydacker.

There was one point he desired to speak of, and this was concerning the case of lupus that had been treated with unfortunate results by the X-ray, which treatment had caused an X-ray burn. One could get results every time in treating lupus by the use of tuberculin. He could arrest the progress with tuberculin, and he had never seen it fail in a case of lupus. It was lupus that first attracted his attention to the use of tuberculin.

Dr. Richard J. Tivnen emphasized the importance of the dressing used in these cases. There was no class of work in his judgment where there was so much attention to detail demanded as in cases of skin grafting. Among the essential details one of the most important was the aftercare and the method of dressing. It was the general impression among surgeons that grafts prosper better without any dressing, that is, the "open method." His own experience had taught him the advantages of the open method of dressing and he now used it entirely.

Dr. Snydacker stated, in reference to the use of grafts on the lid, that for smaller degrees of ectropion he had resorted to a little operation which he reported a few years ago. He had found it so simple, so easy and so certain in the smaller degrees of ectropion that he had been using it since then. Where he had a lower lid to deal with he repaired the defect in one lid by using the skin of the other lid. He made a circular flap and used skin, following the lines of the orbicularis and anatomic lines. If he wished to repair the lower lid he loosened the outer angle of the eyelid; he destroyed the hairs at the edge of the lid; he dissected or loosened the skin of the upper lid by means of a Graefe knife for a short distance, drew down the upper lid, brought the circular flap in place and replaced it. The ectropion could not return because the lines of shrinkage were in the opposite direction to the ectropion.

Influenza as a Causative Factor in Acute Glaucoma.

Dr. Dwight C. Orcutt said that during the last few months, since the prevalence of influenza, there seemed to have been a larger number of cases of glaucoma observed at the Infirmary. About Christmas and during January there was a marked increase. He had seen more of the sequelae of influenza in the various conditions which he handled, such as headache, transitory diplopias, than ever before in the same length of time, so that he began to inquire among the cases of glaucoma and found that the majority of them gave a history of having had influenza during the fall or winter that was followed by a glaucomatous attack, in some instances immediately.

Reasoning from analogy the recent contagion was of the edematous type. Of the pneumonia patients who died, many died of acute edema. When one was called in to see cases of influenza he observed puffy, edematous conditions of the body. There was a stasis of the circulation, and glaucoma being a circulatory disease, the circulation being very poor, produced the glaucoma. So that he brought this subject up to find out what the experience of other members might have been during the past few months in regard to glaucoma.

Dr. Munns had the data taken from the histories of patients at the Infirmary, and thru the kindness of other members of the staff they had been able to get a list of the cases they found during the past six months, and in comparison with them they had gone back over a period of some four or five years trying to find out the number of cases of glaucoma.

Dr. Shirley Bogart Munns stated the standard textbooks on diseases of the eye mentioned influenza as an exciting cause of glaucoma. With this in mind one should not expect a paper dealing with glaucoma in relation to the recent influenza epidemic to be in any way startling.

In comparing the cases of glaucoma admitted to the Illinois Charitable Eye and Ear Infirmary during the months beginning September 1st, 1918, and ending March 31st, 1919, with those admitted during the corresponding 7 months of the 3 preceding years, one finds a great increase in the acute form during the past 7 months. To simplify the classification, the simple chronic cases, of which there were very few, and the chronic inflammatory cases were classed under one head as chronic. In 1915-16, 14 per cent of the cases of glaucoma were acute; in 1916-17, 26 per cent were acute; in 1917-18, 20 per cent were acute, and in 1918-19, 60 per cent were acute.

During the past seven months there were 13 cases of acute glaucoma admitted to the Infirmary and 9 cases of chronic glaucoma. Of the 13 acute cases, 8 gave a history of the so-called Spanish influenza preceding the onset, one followed an attack of erysipelas, another had at the time of entrance a late secondary syphilid and a four plus Wassermann, while another proved to be a diabetic. The two other acute cases gave no history which would suggest an exciting cause. Only two of the nine chronic cases gave a history of Spanish influena immediately pre-

ceding an acute exacerbation. There were twice as many cases of secondary glaucoma during the past seven months as there were during the same period in any of the three preceding years.

In the acute inflammatory variety of glaucoma which we were considering in this paper, the pathologic condition was classified as an inflammatory edema. Not only was the actual fluid increased in amount, but the very vascular uveal tract was edematous thruout. Now Spanish influenza was *per se* a disease of edema. If the toxin would so alter the vessel wall that the blood serum would pass too rapidly into the surrounding tissues, was it not possible that this might occur in the uvea? Extensive involvement of the lungs obstructed the pulmonary circulation and thus produced venous stasis which might tend to favor the production of glaucoma. Atropin was the one great drug used during the recent epidemic. It was given in larger and more frequent doses than ever before. It was not uncommon to find the patient with atropin mydriasis. Could not this have been a causative factor in the production of glaucoma? Producing mydriasis by dropping atropin into the conjunctival sac of persons over forty was a dangerous procedure. All of the cases they had of acute glaucoma complicating Spanish influenza were over forty years of age.

Returning to the statistics, 5 of the 13 cases of acute glaucoma did not bear any relation to the recent epidemic. With only 5 acute cases the proportion of this type was reduced to that of the three preceding years. Thus it could be assumed that the 8 cases, while probably predisposed to glaucoma, were directly excited by an attack of Spanish influenza.

DISCUSSION.—Dr. Clarence Loeb stated that the remarks of the previous speakers would seem to show that there was some relationship between so-called influenza and acute glaucoma. In speaking of this one should be very careful to distinguish between the influenza we knew a great many years ago and the influenza that occurred in the last year. The former was the product of the influenza bacillus, whereas the latter was an entirely distinct disease so far as we had been able to learn from internists. Therefore, he thought in the title of the paper a distinction should have been made between former influenza and the so-called Spanish influenza.

Dr. G. Henry Mundt said he would like to know whether any difference was noted in the efficiency of the treatment of the 8 cases reported with eserin or operation. The theory or supposition was that eserin was probably less efficacious than in the ordinary type of glaucoma. The speaker had seen some cases of glaucoma following or during an attack of so-called Spanish influenza, two of them were acute and one noninflammatory which developed during an acute attack of influenza.

He thought the members should be very cautious about saying much regarding the use of atropin precipitating glaucoma. He did not know whether it did or not, and he would like to hear the experience of others in regard to precipitating glaucoma by the use of astropin.

Dr. Harry M. Ivins, Cedar Rapids, Iowa, said he had had a few cases of acute glaucoma during the winter months when the influenza was quite prevalent. Whether or not the influenza had anything to do with producing the glaucoma he could not say. He had not thought of it in that light. As to the use of atropin in producing or precipitating glaucoma, he had always supposed that glaucoma could be caused and was caused by the use of atropin.

He recalled the case of an old gentleman who was working in the Masonic Temple at Cedar Rapids and was seized with a severe pain in his eye. He went to the family physician who supposed that the man had an iritis. He put atropin in the eye, and before the doctor discovered what had happened the man was blind in that eye, and later became blind in the other eye and today is totally blind. This was an instance where a man went blind following the use of atropin, altho

it did not prove he did not have glaucoma in the first place or would not have had it and would not have been blind.

Dr. Thomas O. Edgar, Dixon, Illinois, in reply to the question of Dr. Mundt, cited a case of irido-cyclitis, that he had recently observed, in which atropin was indicated, but, almost every time it was used the tension went up temporarily; and when atropin was discontinued the tension would go down. On the other hand, during an exacerbation of a case of chronic irido-cyclitis, with extensive posterior synechiae, the use of atropin caused the tension to become normal again, undoubtedly because it loosened up the adhesions. Such experiences were not isolated.

Dr. Oliver Tydings said it would be unfortunate to let it go out that it was the consensus of opinion that atropin was not contraindicated in suspected cases of glaucoma. He had not had any experience in seeing glaucoma precipitated by the use of atropin, but he recalled some cases that were attributed to it.

The only fulminating case of glaucoma he ever saw was when he was called to see a patient for the first time, who said she had not felt well for a day or two, but had not called a doctor until she noticed she could not see. This was about 8 P. M., and he asked for an immediate operation, this was declined. Consultation was granted, and both eyes operated upon the next morning before 6 o'clock. The patient was stone blind at the time of the operation, and was until her death some years later, and she had not had sufficient trouble before that evening to call a physician. There was no history of the use of atropin, or that she had used any domestic remedy which could be suspected of cycloplegic action. This was not a case where vision had been lost as a result of hemorrhage followed by glaucoma. Gifford, of Omaha, had reported a number of cases of glaucoma following the use of homatropin. The speaker saw one case in a young woman, twenty-one or twenty-two years of age, who was absolutely blind in one eye. He saw her after she had been blind in one eye five years which she attributed to some drops that were instilled into the eye at the Illinois Charitable Eye and Ear Infirmary. She did not know anything about this, but he knew the girl was blind in one eye from glaucoma.

If the colloid theory of Fischer, of Cincinnati was right, the speaker thought that anything which would tend to produce mydriasis or would interfere at all with the drainage system, would produce glaucoma. He certainly would not want atropin instilled into his own eyes if he had glaucoma.

Dr Mundt said he hoped none of the members misinterpreted what he had said. He simply asked whether any member knew of a case of glaucoma that was precipitated by the use of atropin or any other mydriatic.

Dr. Clarence Loeb said that several years ago he had a case of glaucoma simplex which was very well controlled by the use of the ordinary miotics. One day the patient consulted him, and the eyes were found in good condition. Another prescription for pilocarpin was given him. His eyes were much worse that afternoon, after using one drop of the new medicine, and they became suddenly very much worse. He found this man was suffering from an attack of acute glaucoma. He looked up the prescription and on it was written two per cent pilocarpin. The druggist stated absolutely that the prescription was filled as written, but the same medicine was used as a control in a rabbit and it produced dilatation of the pupil. He did not know whether atropin or hometropin was used, but certainly one of them was given instead of the pilocarpin that was prescribed, and there was no question that it caused an acute glaucoma.

Dr. N. C. Nelson stated that at the Infirmary he had taken the blood pressure and intraocular tension in about 75 cases before operation. They found quite a number of patients that had developed glaucoma who had a high pulse pressure and showing that the intraocular tension was increased. Very high pulse pressure was very often found even if the intraocular ten-

sion was not increased at the time the blood pressure was taken but would develop an increased tension after operation. They found that a patient might have a high blood pressure (systolic) the pulse pressure being normal; also that a patient could have a normal blood pressure (systolic) according to his age, but have a high pulse pressure.

He thought that if all cases were followed up closely; and blood pressure and intraocular tension taken in all cases before operation, one would find there was a glaucomatous condition present already, and any operation or traumatism to the eye helped to precipitate a latent glaucoma. This condition was probably due to the whole system undergoing the same changes as those that produced arteriosclerosis. They had not as yet worked out as many cases as they would like to do, but so far as they had gone there seemed to be a very close relation between the high pulse pressure and glaucoma.

Dr. Orcutt, in closing, stated that the sooner one operated on a case of acute glaucoma, the sooner he would save the eye. If one could gain the consent of a patient suffering from acute glaucoma, with a tension above 35, his advice was to operate, as one would be able to save a good useful eye.

The operation he had been following almost entirely was trephining, and during the past year he had not had one failure in his service from trephining. He had had one case of an old chronic glaucoma in one eye, and an acute condition in the other eye, in which the glaucoma recurred in the chronic case. A second trephining was done on the lower portion and the eye had been all right since.

The worst case he had ever had was one in which atropin was used. He finally resorted to operation and the patient recovered with fairly useful vision. Glaucoma might develop in iritis or uveitis where atropin was used due to the adhesions interfering with circulation of the eye.

Dislocation of Both Lenses.

Dr. Oliver Tydings exhibited and reported a case of dislocation of the both lenses in a Sister, thirty-five years of age. The pupil was not widely dilated. He had not examined the case for three or four weeks. He had used cocain three times since coming here but had not been able to secure much dilatation of the pupil. There was no irregularity of the pupil. Last July the patient came to him with the lens dislocated in each eye. At that time the zonule was not broken above but the lens was dislocated temporarily in each eye. Patient was fitted with glasses some years before and was wearing minus ten or eleven, he did not remember which. After advising her to be operated on, he did not see the patient any more until about a month ago. When she came back the lens was not only broken towards the nasal side but the zonule above was broken. In the meantime the patient had gone to an optometrist in Indiana who succeeded in fixing up a pair of glasses for twenty-two dollars, and they were plus. They were cataract lenses.

He would like the members to examine the case and offer suggestions as to treatment.

Discusion, Dr. Orcutt said he had had the case of a boy with both lenses dislocated upwards. In this case he needled them.

Embolism of the Central Artery.

Dr. D. C. Orcutt exhibited and reported the case of a man who, while sweeping, suddenly became blind two weeks ago. When admitted to the Infirmary he was just able to see his way about. As he had not the history of the case he was not able to say definitely what the man's vision was; but there was every indication that this was a case of embolism of the central artery. Both arteries were shrunken. The fundus was white. There was a bright red spot in the macula. The urine showed the presence of albumin. He had a blood pressure of nearly 200. He had not made a positive, but simply a tentative diagnosis of embolism of the central artery.

Cyst Occupying the Region of the Lacrimal Sac.

DR. CLARENCE LOEB reported the case of a man who gave the history that he awoke one morning with a severe inflammation of one eye with swelling, which lasted two days. This swelling was situated over the lacrimal sac and was about the size of a lima bean. It had a resistant feeling such as a sebaceous cyst would give. Was this a case of sebaceous cyst or one of dacryocystitis?

DISCUSSION. Dr. Michael Goldenburg did not think Dr. Loeb's case was one of sebaceous cyst, but an anomalous development of the anterior ethmoid cells. The walls of the ethmoid cells were very thin, at times, and on blowing the nose one could notice swelling. He had had three such cases in which the anterior ethmoidal cell was involved. If one applied firm pressure over the swelling it would evacuate it.

He saw one case of swelling of the lacrimal sac in which no pus could be expressed. He irrigated the sac and forced fluid into the nose quite freely. An incision was made in the region of the sac and the sac was found to be normal. In one case he followed the sac along the orbital wall for about one and a half inches and into the ethmoid, made a good big hole, and closed it up anteriorly, compelling it to drain into the nose.

BALTIMORE CITY MEDICAL SOCIETY.
OPHTHALMOLOGICAL SECTION

March 19, 1919.

DR. DOWNEY PRESIDING.

Base Hospital Unit.

DR. WHITHAM read a paper on the history of the eye department of the Johns Hopkins Base Hospital Unit, from its arrival in France with the first convoy of American troops in June, 1917, until its enlargement into the newly formed opthalmic center in April, 1918, and described the growth and development of the latter institution, with a sketch of its purpose and the scope of its activities from that time until his departure for America on February 1, 1919.

Detachment of the Retina in Eclampsia.

Dr. Clapp read the paper published in full p. 473.

In discussion Drs. Harlan, Randolph and Fleming stated that they had never seen such a condition.

Albuminuric Retinitis.

Dr. Clapp then exhibited a fundal drawing of a case of acute albuminuric retinitis, which was very atypical. At each macula was a central pearly white mass surrounded by a yellowish white exudate; the right eye showed more advanced stage than the left; left macula showed some fat globules above surface of retina.

Neuroretinitis.

Dr. Downey presented a drawing of a case of acute neuroretinitis, which was found later to be specific.

Recovery of Sight After Injury.

Dr. Harlan reported a case of a gun-shot injury with the shot remaining in the eye, as shown by x-ray. He had given an opinion that the eye was lost; but recently had seen the patient and with a correcting glass the individual had a vision of 20/30.

C. A. CLAPP, Secretary.

ABSTRACTS

Ramsay, A. Maitland.—Treatment of Prolapse of Iris. (British Journal of Ophthalmology, Nov. 1918, p. 554.)

This article presents a very good resumé of the usual methods of treating prolapse of the iris, with variations depending upon whether the case is one of recent origin or more than forty-eight hours standing, and whether the prolapse is due to a penetrating wound of the cornea or the result of a perforating ulcer of the cornea.

In speaking of quite recent prolapses

due to penetrating wounds of the cornea, Ramsay points out that such conditions may be overlooked by the inexperienced, since the grey color of the iris is difficult to see; that, however, the shape of the pupil is always altered, pear-shaped with the narrow part pointing to the prolapse; that the endeavor should be made to draw the iris out of the wound and back into the anterior chamber by atropin or eserin according to whether the wound is central or peripheral, but that this endeavor is not often successful since the bruised iris has lost its elasticity and is easily drawn into the wound after replacement and thus form an anterior synechia even though it does not prolapse again; and that, if replaced, infection may be carried into the eye. All things considered, therefore, believes careful excision to be the best treatment for a recent prolapse.

After excision of the prolapse in such cases, and coaptation of the edges of the wound, the latter is covered with a conjunctival flap brought from the limbus in the neighborhood of the wound. After the parts have been carefully dried, a coating of paraffin is applied to seal the edges of the flap to the cornea and give additional protection to the wound; the paraffin employed is a substitute for ambrin and is known as No. 7; it is non-irritating to the eye and is readily applied in the liquid state by a medium-sized camel-hair brush; it becomes solid almost immediately.

When the wound implicates the sclera as well as the cornea and the prolapse includes the ciliary body and cornea as well as the iris, with loss of vitreous, no speculum should be employed but the upper lid be held back with retractor or strabismus hook. The bulbar conjunctiva should be separated from the posterior lip of the wound, and undermined freely for a considerable distance around the seat of injury. The whole of the prolapse uvea must now be carefully excised, and the lips of the wound approximated by drawing the conjunctiva over the cornea like an apron, and fixing it securely in its new position by as many sutures as may be required—the fewer, however, the better. No attempt ought to be made to stitch the sclera.

Next he considers the treatment of prolapse following penetrating wounds which has existed several days, pointing out the necessity of breaking down adhesions and the difficulties connected with such separation, and also the necessity for avoiding the entrance of sepsis into the interior of the globe. When the prolapse is small, it may be wisest to leave it alone altho the subsequent danger of secondary glaucoma and the liability to future infection must be remembered; on this account it is advised to deal surgically with such prolapses, if prudent to do so, by separating the iris from the lips of the wound and excising and then removing any tags of iris tissue left behind with fine forceps or scissors. If the edges of the wound show signs of septic infection they should be touched with the galvanocautery, and afterwards covered with a conjunctival flap. In such cases, the writer is in the habit of giving 4,000 units of antidiphtheritic serum subcutaneously and a second dose of half this amount twelve hours afterwards; he has seen favorable results following the use of serum and advises its use confidently in all cases where the eyeball is infected.

Finally, the treatment of prolapse due to perforating ulcer of the cornea is considered; this complication may follow the perforation of any cornea ulcer but occurs most frequently in the marginal ulcer seen in phlyctenular keratitis in children. In such cases the opportunity for simple excision rarely presents itself since the ophthalmic surgeon does not, as a rule, see the child until several days after the perforation has taken place. Under such circumstances, a small prolapse is found covered with exudate, speedily transferred into connective tissue, and the only prudent treatment is to leave the case to nature. When, however, the prolapse is large, the remains of the cornea and newly formed connective tissue are not strong enough to

withstand the force of the intraocular pressure, so, instead of the prolapse flattening, it bulges forwards, and unless something can be done to arrest it, the eye will be destroyed by anterior staphyloma or by general distension of the globe; in such cases the expectant plan of treatment is unsuccessful and an attempt should be made to reduce the prolapse and to strengthen the cicatrix. The night before the operation the conjunctival sac is filled with White's ointment (1:3000 bichlorid) and at the time of the operation the skin of the eyelids and surrounding parts is painted with iodin. The conjunctiva is then seized by forceps and divided with scissors at the sclerocorneal border in the neighborhood of the prolapse, and separated freely from the episcleral tissues. The prolapse is now burned down to the level of the cornea by galvanocautery, heated to a dull red, care being taken not to destroy the exudate which seals the iris to the substance of the cornea, and if possible the anterior chamber should not be emptied. The conjunctiva which has been separated from the eyeball is then drawn over the prolapse and the ulcer of the cornea, so as to cover them completely. While the flap is held in position by two pairs of forceps, a small piece of conjunctiva should be excised on either side, in order that, when the sutures are tied, two raw surfaces are approximated; this prevents the flap from slipping back into its former position and greatly assists the whole object of the operation which is to bring about the firm healing of the flap of conjunctiva, the cauterized surface of the iris and the edge of the ulcer of the cornea. The conjunctiva supporting the cornea should be covered by a layer of paraffin, atropin instilled, followed by a disc of ten-per-cent collargol gelatin. In several weeks healing will have taken place, but secondary glaucoma may supervene; hence iridectomy should be performed. When the iris is drawn towards the cicatrix so that the pupil is obstructed, the iridectomy should be placed so as to give the most satisfactory optical result. Even at best, however, vision is seriously impaired, and in cases of deep ulcers of the cornea every effort ought to be made to prevent accidental perforation by timely paracentesis of the cornea through the floor of the ulcer; by that means prolapse of the iris will be prevented and the formation of anterior staphyloma avoided.

C. H. M.

Morax, Moreau, and Castelain.—Types of Alteration of Macular Vision in Traumatic Occipital Lesions. Ann. d'Ocul., 1919, v. 156, p. 1.

The authors describe the lesions seen since 1914, using the method of examination described by Moreau. (Ann. d'Ocul., 1918, v. 155, p. 357.) The great difference between traumatic hemianopsia and that due to vascular or meningeal lesions is that in the former there is initial great intensity of functional disturbance, a complete blindness which may last days or weeks, to be replaced months later by circumscribed loss of function in the form of a scotoma, often very limited, in similar parts of the visual fields. Once established, this does not change, the hemianopsia remaining a permanent lesion. The patients described were examined in this stage, and were 88 in number, comprising only those where the trauma affected the occipital centers and not the fibers elsewhere, e. g., the chiasm.

The functional ability of the retina may be divided into three zones, (a) the zone of fixation, corresponding to the macula, 1.5° to 2°; (b) the central zone, corresponding to the macula, about 10°; and (c) the peripheral zone, the rest of the retina. The present article deals with lesions affecting only the first two zones. Lesions of the right hemisphere cause left homonymous hemianopsia; while lesions of the left hemisphere cause right homonymous hemianopsia. To produce bilateral homonymous hemianopsia, a lesion of both hemispheres is necessary.

There are seven types of hemianopsia summarized in the following table:

TYPES OF HEMIANOPSIA.

I. Homonymous hemianopsia, 27 cases.	
A. Not affecting macular vision	19 cases
B. Affecting macular vision	8 cases
I.. Sector hemianopsia, 18 cases.	
1. Inferior	
A. Not affecting macular vision	6 cases
B. Affecting macular vision	8 cases
2. Superior	
A. Not affecting macular vision	1 case
3. Double inferior	
A. Not affecting macular vision	3 cases
III. Hemianopic scotoma, 20 cases.	
1. Median type	
A. Without macular involvement	1 case
B. With macular involvement	4 cases
2. Inferior sector	
A. Without macular involvement	3 cases
B. With macular involvement	4 cases
3. Double sector	
A. Without macular involvement	4 cases
B. With macular involvement	1 case
IV. Homonymous hemianopsia with hemianopic scotoma of the opposite side, 14 cases.	
A. Without macular involvement	4 cases
B. With macular involvement	10 cases
V. Double hemianopic scotoma, 4 cases.	
1. Median	2 cases
2. Inferior	2 cases
VI. Homonymous hemianopsia with central scotoma	2 cases
VII. Blindness	1 case
	86 cases

Each type is illustrated by one or more case histories with fields of vision, and drawings indicating location of the cranial wound. C. L.

Cantonnet, A.—The "Hole in the Hand" Test of Binocular Vision. Med. Press, Oct. 23, 1918.)

The writer describes an amusing physical phenomenon which he considers an excellent means of guaging binocular vision: If a cardboard tube or roll of paper is held before one eye, the right for example, and the left hand is placed open about ten inches before the left eye, the right eye will see whatever is visible thru the lumen of the tube, while the left eye sees only the hand; the images of the two eyes are fused in the brain, and we get the impression that the left hand has a hole in it thru which we see the objects comprised in the field of vision as seen thru the tube.

Cantonnet uses this test not only for the purpose of proving binocular vision, in which case both the tube objects and the hand must be seen, but he employs it to detect heterophoria: If the tube is seen to the right of the center of the hand or to the right of the hand, this indicates excessive convergence; if the hole is seen on the left side of the hand or to the left of the hand, this shows divergence; if the hole is displaced perpendicularly, a vertical deviation exists.

This test is recommended as simple and sensitive especially as a means of diagnosis at the disposal of the general practitioner, though he also finds it of great service in the treatment of strabismus at all stages. C. H. M.

J. E. L. Kraft and **G. ten Doesschate.—Treatment of Gonorrheal Ophthalmia by Diathermia.** (Tydschrift, f. Geneesk, July 21, 1917.) These authors report three cases.

The patients were treated with the large instrument of Koch and Storzel, which receives an alternating current of about 150 volts, with 50 alternations in the second. This current comes from the street current, a direct current of 220 volts, thru a special transformer. The instrument is regulated in the primary and secondary diathermia current. The regulation of this last one depends on the sensibility of the patient, with consideration of possible diminishing of the heat sense. The electrode which is put on the eye is made from solid metal and bent so that the surface conforms to the front of the eyeball. Between the lids and electrode a thin layer of cotton, wet in salt solution, is put. The other (lead) electrode is tied around the patient's neck.

It is most probable that the success is due to the heat development with its successive hyperemia, as nothing is seen of electric reactions.

Case 1. Eighteen years old, treated for gonococcal urethritis since Nov. 27. On Dec. 9 L. E. became inflamed. Next day he was sent to Utrecht. Treatment with 2% Arg. nit., 10% protargol and 1/5000 potas. permang. The right conjunctival sac became also infected, but was well again after a few days. In the left appears, especially at the upper side of the cornea, a strong chemosis, so that this is covered half way. An ulcer followed, the keratitis kept growing in severity, and gonococci were continuously found in the pus.

On Dec. 23 L. E. was treated with thermopenetration, current less than ½ ampere. After three hours the chemosis had nearly disappeared.

Dec. 24, there was no more secretion of pus; no chemosis, the cornea had cleared. After two more treatments, of 15 minutes duration, the patient was discharged cured.

Case 2. Two years later a second patient was treated. March 13, a 26 years old man showed a gonorrhoic inflammation of L. E. without symptoms of urethritis. He came under treatment on March 24 with L. E. V = 1/200; perforation of cornea and prolapse of iris; R. E. V —5/5. L. E. kept secreting pus containing gonococci in spite of diathermia treatment. On March 26 R. E. showed pus with gonococci, with lowered vision. Two hours after the first diathermia treatment (during 15 minutes) no gonococci were found in the quickly diminishing pus. R. E. was cured quickly, while it took about 10 days to sterilize L. E.

Case 3. Man 24 years old had for 6 days pain in L. E., and since 4 days of R. E. in connection with gonorrhoic urethritis. The patient came with a large deep ulcer of L. E. Besides the usual treatment he received daily diathermia treatment; but the number of cocci in the pus hardly diminished. The skin of the eyelids was strongly macerated thru preceding moist compresses, which prevented reaching high temperature, on account of pain. In the night of April 14 the ulcer of O. S. perforated, after this no gonococci could be demonstrated. They continued a few in R. E.; but disappeared after starting diathermia again, which had been stopped during some days for some accidental reasons. E. E. B.

Medical Inspection of Schools in New Zealand. (The Medical Journal of Australia, 13-4-18).

From 1912 to 1916 six doctors examined 100,000 children. From 7% to 10% of the children have defective vision. The inspectors notify the children as defective when they read less than 6/9 in each eye with Snellen's test-types. As usual more defective sight is found in the upper classes. Owing to various causes the child is compelled to choose between no treatment at all or treatment by an unqualified optician. It is suggested children's clinics should be established in connection with the out-patient departments of the hospitals. For country children no scheme has as yet been evolved F. P. M.

American Journal of Ophthalmology

Series 3, Vol. 2, No. 7 July, 1919

PUBLISHED MONTHLY BY THE OPHTHALMIC PUBLISHING COMPANY

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Proof should be corrected and returned within forty-eight hours to the printer. Reprints may be obtained from the printers, Tucker-Kenworthy Co., 501 S. La Salle St., Chicago, Ill., if ordered at the time proofs are returned.

Subscriptions, applications for single copies, communications with reference to advertising or other business, should be addressed to
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THE ABUSE OF CANALICOTOMY IN SIMPLE EPIPHORA.

Is there or is there not a tendency among the rank and file of Ophthalmic Surgeons toward sane and safe treatment of lacrimal diseases, especially the simple forms of lacrimal obstruction? The conservatism of the Philadelphia Surgeons, the radicalism of Baltimore and of some Surgeons in the Middle West, are the extremes.

Is there no safe middle ground? Yes:— The treatment is drainage, first, last and all the time, but anatomic drainage and not artificial drainage. Why is canalicotomy for epiphora so often performed in these more enlightened days, when the cause, be it conjunctivitis with excess of tears and thickened secretions, punctal obstruction, lacrimal sac catarrh, closure of the saccal or nasal ends likely due to hypertrophied turbinals or deflected septum leading to obstruction, may and should be first removed before radical procedures are performed upon the tear passages?

Certainly if probing is to be resorted to, dilatation of the punctum is the first step, to be followed by syringing with mild solutions. If cocain with adrenalin then be injected into the sac, large sized probes, even No. 8 Bowman, 6 Fox or 4 Theobald may be passed without pain and without resort to the unwarranted slitting of the canaliculus. These sounds are as large as the normal bony canals will contain. Then after removal of the ocular or nasal cause a practical cure will ensue.

The lacrimal puncta are not only the beginning of the sewer system for the drainage of the tears and mucous secretions, but the canaliculi form with these entrances a very perfect capillary, gravity and suction pump apparatus, the latter acting both by the ring muscle around its lumen and by the pressure massage of the movements of the lids. All but the open sewer gravity functions of the lacrimal passages are destroyed by the transformation of this tube into a slot by slitting the canaliculus by the Weber, Bowman or Stilling knives. Canalicotomy should not be done except in the presence of pus in the sac, and for that not very often.

H. V. W.

THE ATLANTIC CITY MEETINGS

It is safe to say that the gathering of Ophthalmologists in the Section on Ophthalmology of the American Medical Association, June 11-13, at Atlantic City, was the largest gathering of the kind that will be held this year anywhere in the world. There were more than 450 who registered their attendance, about one-tenth of the total registration of the Association; and among those who registered with the Section on Laryngology, Otology, and Rhinology were many who divided their time between the meetings of the two sections.

The meetings of the American Ophthalmological Society which followed, June 14-17, were smaller, about 120 registered; but were of equal scientific interest and importance. This oldest American organization of specialists seems largely to have recovered its scientific activity, after the depression incident to the absence of members in military service.

In the programs of both meetings war requirements, emergencies and experiences furnished the dominant interest. Almost half of those whose names appeared upon the programs had been in active service, and nearly all the others had been serving on the various boards and units for the examination of recruits. While war experiences have been the basis of so many of the papers presented and discussed at these meetings, the more complete history of ophthalmology and the advances it made in the recent war is yet to be written, after individual observations have been more generally coordinated, and more thoro study has been bestowed upon them.

In the reports of the above meetings to appear in this JOURNAL the attempt will be made to duplicate as little as possible, the reading matter put before our subscribers. A steadily increasing number of foreign subscribers must be informed of what is going on in Ophthalmology in the United States; but the bulk of our readers are American. The *Journal of the American Medical Association* reaches the great majority of them, and in it will be published most of the papers and discussions of the Section. These papers have already reached half our readers in the presession volume; and all of them will become available thru the transactions of the section, which will also contain a full report of the discussions to which they have given rise. Under these circumstances, except for the few papers that do not get published in the *A. M. A. Journal*, the account given in these pages will be little more than a resumé that will indicate what may be found in these fuller reports.

With the American Ophthalmological Society it is different. Its program with brief abstracts of most of the papers is sent to its members, less than 200 in number; and when its transactions containing those papers, and the discussions to which they gave rise, are published, they will have but a limited circulation outside its membership. Hence it is right that more of those papers should be published in full in this journal and elsewhere; and we will try to give a more complete account of both papers and discussions than is required for the meetings of the Section.

However much of value may be gained from reading reports of these meetings, let no one suppose such reading can be equivalent to attendance on the meetings themselves. Personal contact with one's colleagues, the subtle significance of tone and manner, cannot be transferred to the printed page; and much of the value of the meeting lies in those private talks between two or three friends where discussion is directed by individual interests and needs, where question and answer can follow each other so directly that the discussion is always kept to the point, and there can be no failure of interest.

The efficiency of democracy is kept up by the continual infusion of new blood. Much of the success of these organizations depends on the wise choice of a new presiding officer each year, one who is familiar with the work of the society from long participation in it, and is particularly interested in making the meeting of his year a success.

The routine work of the organization is done by the Secretary, who when found efficient, is kept in office so long as he feels himself sufficiently compensated by the thanks and appreciation of his colleagues; and by a standing committee. In the Section of the A. M. A., the "Executive Committee" consists of the Chairmen of the three years immediately preceeding. In the American Ophthalmological Society, the "Council" is composed of five members, one chosen each year to replace the senior member, who retires from that body.

This year it was not surprising that the officers of the Section should be chosen from among those who had been the leaders of so large a portion of its members in military service. But it was an interesting coincidence that three of them had been so closely associated in their work in France, as the accompanying photographic reproduction shows. Dr. Allen Greenwood was chosen Chairman, Dr. Nelson Miles Black, Vice-chairman, and Dr. George S. Derby, Secretary of the Section.

Dr. Lee Masten Francis, who will represent the Section in the House of Delegates, was also closely associated with his colleagues in the work in France. Dr. Walter R. Parker, late chief of the Division of Surgery of the Head in the Surgeon General's Office, was chosen to represent the Section on the American Board for Ophthalmic Examinations. He succeeds Dr. Edward C. Ellett who by the completion of his second term on the Board became ineligible for reelection.

Nelson Miles Black George S. Derby
Allen Greenwood

In the American Ophthalmological Society, custom determines the choice of the Vice-President of one year, to be the President of the next. In this way Dr. Hiram Woods of Baltimore becomes President of the Society and

Dr. John E. Weeks of New York, Vice-President. Dr. Thomas B. Holloway of Philadelphia, having in the last year proven an efficient Secretary, is re-elected to that office.

Next year the American Medical Association will meet in New Orleans, probably early in May; and the American Ophthalmological Society will meet at Hot Springs, Va., in June. Those in charge of the preparations for these meetings are among our most valued collaborators and contributors. We tender them the hearty support of this journal in making their meetings most useful to the ophthalmologists of America. E. J.

WELCOME TO THE NEW EYE JOURNAL.

THE REVISTA CUBANA DE OFTALMOLOGIA, under directorship of Dr. Francisco Maria Fernandez, of Havana, Cuba, with a large list of collaborators thruout the world, save in the enemy countries.

Surely this is the most pretentious first number of an eye journal that has appeared. It is a quarterly and to the reviewer's great pride, has been modeled upon the former American Quarterly, "Ophthalmology," now amalgamated with our journal.

The first number contains two hundred and twenty-six pages, of which sixteen are given to biographies of some of the editors of the original articles. Eight are by Juan Santos Fernandez upon various subjects. Of particular interest are those on cataract and trachoma. Uribe Troncoso has an article on acné-rosacea of the eye. Espino, Rinconos, Gonzales, Penichet, Cohen, Escolano, Francisco Fernandez and Guiral have the others.

A number of paragraphs are given to the progress of Ophthalmology, and more to extracts from the literature. Reviews of French, Spanish, American and Japanese journals are given.

Reports of the Section on Ophthalmology of the New York Academy of Medicine, the Ophthalmological Society of Madrid, and the Mexican Ophthalmological Society, together with necrologic notices and news items, make up a very commendable book.

The printing, paper and illustrations are beautifully done. Certainly Fernandez' ambition has led him to begin a great work, a man-sized job in fact, and a credit to the foreign language press.

H. V. W.

BOOK NOTICES.

The Blind, their condition and the work being done for them in the United States. By **Harry Best,** PhD., New York; The MacMillan Company. 1919. 763 Pages. Price $4.00.

After a life-time spent in the treatment of the eyes by the reviewer, it has always been a marvel to him that the practising oculist sees relatively so few of the blind. Our work being preventive of this terrible condition, it behooves us to have a little more knowledge of those who have passed beyond our help and this work is therefore a welcome source of information. The field of inquiry therein has been limited mostly to the United States, but takes up a vast number of subjects under the general headings of "The General Conditions of The Blind; Blindness and the Possibilities of its Prevention; Provision for the Education of Blind Children; Intellectual Provision for the Adult Blind; Material Provision for the Blind; Organizations Interested in the Blind; Conclusions with Respect to the Work for the Blind." Our particular interests are the questions of pensions, indemnities and legal measures. A great number of abstracts of legal cases are given, and are very valuable for reference. As experts, ophthalmologists are more or less often called into court, and questioned about these things.

H. V. W.

This book contains a wealth of material regarding blindness, as seen in its sociologic, institutional, economic and legislative aspects. If to it one adds the insight into personal problems and living adjustments, that are so well revealed in the little book of Javal, he

will have a very good mastery of the subject in all its phases; as it is liable to be presented to the ophthalmologist by patients, corporations or courts seeking his advice and assistance.

E. J.

The Refraction of the Eye. A Manual for Students, by **Gustavus Hartridge,** F. R. C. S. London, Sixteenth Edition. 12 mo., 294 pages, with one hundred and ten illustrations. Philadelphia. P. Blakiston's Son and Co. 1919. Price, $2.25.

With regard to such a book, which has reached its 16th edition, the function of this notice is merely to introduce the work to a new set of readers, a new generation of students of ophthalmology.

As the subject of refraction becomes a fixed and definite part of the medical curriculum, we may expect a long life for the best text books relating to it. By comparison with others of its class this is found, after 35 years, still to be the best for the average physician taking up the study of ophthalmology as a specialty. It presents the basic facts briefly and clearly, with an abundance of illustrations, and practically no algebraic formulas to struggle with.

The plan of representing astigmatism by two lines at right angles to each other, and accompanying figures to give the diopters of ametropia in each meridian has been introduced to the profession thru this little work, and, is widely used to help understand and teach the subject.

Perhaps the most important additions we find are the account of new kinds of glass used in spectacles, and of the visual requirements for the Royal Air Force which has come into existence since the 15th edition was published. It is in striking contrast with the American standard, that the British admits fliers with vision of 6/12 in the best eye capable of correction to 6/6, and in the worse eye, 6/18 correctible to 6/12.

There are larger books on refraction, but none better than that of Donders which has been before the profession for 55 years. There are important things that are only to be learned from these larger works. But it would be a grave mistake for any one starting out to get a practical working knowledge of the subject to begin with the treatise of Donders, or others of similar size and detail. The best we can say of Hartridge's book is that it has all its old excellences and is kept well up to date.

E. J.

The American Encyclopedia and Dictionary of Ophthalmology. Edited by Col. Casey A. Wood, M. R. C., U. S. A., etc. Assisted by a large staff of collaborators. Fully illustrated. Vol. XIV. Chicago, Cleveland Press, 1919.

This volume carries the work from "Protractor" to "Retina, Cyst of the," making the number of pages thus far issued 11,208. The number of collaborators who have contributed to this work is 61, of whom 8 are already deceased. Judging by other encyclopedias and dictionaries there should be about three volumes still to come, and with the continued good health of the Editor and energy of the publisher these should be forthcoming by about the end of next year. We can begin to feel sure that it will be completed; and as such a tremendous undertaking is not likely to be attempted again in the near future, this work with possible supplementary volumes will long remain the great reference work on ophthalmology and related subjects.

In this volume, as in its predecessors, certain subjects, because of their scientific and practical importance and the space given them, stand out prominently. "Pupil in Health and Disease," written by Dr. Derrick T. Vail, occupies 245 pages, and constitutes the most complete monograph on its subject to be found in any language. But it differs from most monographs in adopting the encyclopedic, alphabetic arrangement of the topics treated. Thus "Diagnostic Value of the Pupil" is followed by "Dilated Abnormally," and "Epilepsy," "Eserin," and "Essential Mydriasis" follow each other in immediate succession. The number of such topics is several hundred, and

there are many cross references within the section, so that it is really a better work for references than a more systematic monograph might be. To have stimulated the production of such an addition to ophthalmic literature is something in which Editor and Publisher might well take pride.

The other long section of this volume is the one on "Refraction and Accommodation of the Eye" by A. Edward Davis, 255 pages. Alphabetic arrangement is here impossible. So the section is broken into chapters, the headings of which are arranged in a sort of table of contents, placed at the beginning of the section; and prefixed to this is a list of cross references to 24 other sections of the Encyclopedia which bear on portions of the subject.

About half the section is devoted to "Introductory Principles and Methods of Human Refraction," and the remainder to "Clinical Applications of Refraction Methods." In the latter part illustrative cases are used very extensively. In the former we find, as familiarity with Dr. Davis previous writings would lead one to expect, an excellent, detailed account of the use of the ophthalmometer.

But it must not be supposed that these long sections include nearly all there is of interest and value in this volume. The section on "Radium in Eye Diseases," 10 pages, by the Editor, will be found fresh and of important interest to every one who is trying to keep up to date in ophthalmic practice. The same is true of such sections as those on "Retina, Angioid Streaks in the," "Angiomatosis," "Angiosclerosis." "Pterygium," 23 pages, and "Ptosis," 47 pages, will measure up to standard. They also appear to be the work of the Editor, who has evidently taken a larger share in the compilation of the present volume than of most of its predecessors. With the return of men from military service the support of a wider circle of collaborators should be possible. The Encyclopedia is a live, going concern, and is worthy of editorial as well as of financial support.

NEWS ITEMS

Personals and items of interest should be sent to Dr. Melville Black, 424 Metropolitan Building, Denver, Colorado. They should be sent in by the 25th of the month. The following gentlemen have consented to supply the news from their respective sections: Dr. Edmond E. Blaauw, Buffalo; Dr. H. Alexander Brown, San Francisco; Dr. V. A. Chapman, Milwaukee; Dr. Robert Fagin, Memphis; Dr. M. Feingold, New Orleans; Dr. Wm. F. Hardy, St. Louis; Dr. Geo. F. Keiper, LaFayette, Indiana; Dr. Geo. H. Kress, Los Angeles; Dr. W. H. Lowell, Boston; Dr. Pacheco Luna, Guatemala City, Central America; Dr. Wm. R. Murray, Minneapolis; Dr. G. Oram Ring, Philadelphia; Dr. Chas. P. Small, Chicago; Dr. John E. Virden, New York City; Dr. John O. McReynolds, Dallas, Texas; Dr. Edward F. Parker, Charleston, S. C. Volunteers are needed in other localities.

DEATHS.

Charles Benson, of Dublin, died February 16, 1919.

A. A. Bradburne, formerly of Manchester, after lingering illness during which he resided in the south of England, died May 13th.

Walter Thomas Clegg, London, died in May, 1919.

Sir James MacKenzie Davidson, London, died at the age of 62. He was one of the foremost authorities in the world on X-rays, especially in their applicability to ophthalmology.

Louis Edouard Desjardins, of Montreal, died recently.

Edward F. Drake-Brochman, London, died early in May after a brief illness, aged 76.

James Hinshelwood, of Glasgow, died recently at Mentone, at the age of 60 years.

Lieut.-Col. Wm. Watson, C. M. G., F. R. S., died recently. He was one of the Professors of Physics at the Imperial College of Science, South Kensington. He was well known for his work on color vision.

COMING MEETINGS.

The Pacific Coast Oto-Ophthalmic Society will meet at San Francisco August 4-7.

The Colorado Ophthalmologic Congress will be held in Denver, August 4-5, and will include both ophthalmic and oto-laryngologic papers and discussions.

The American Academy of Ophthalmology and Oto-Laryngology will meet at Cleveland, Ohio, Oct. 16, 17, 18.

PERSONAL.

Dr. Alexander Brown announces the removal of his offices from the Medical Building to the Lathrop Building, San Francisco, California.

The residue of the estate of the late Dr. Richard A. Reeve, of Toronto, goes to the University of Toronto, but the amount is not definitely known.

Dr. Ryuzo Kodama, Associate Professor of Ophthalmology in the Tohoku Imperial University, Japan, is studying with Professor Ludwig Hekoten, of Chicago, Illinois; and attended the ophthalmological meetings at Atlantic City.

Dr. Francisco Maria Fernandez of Havana, Cuba, was a guest at the meetings of the Section on Ophthalmology of the American Medical Association and of the American Ophthalmological Society. He expects to remain in the United States thruout most of the summer.

According to the British Journal of Ophthalmology, C. B. Goulden, late of Oldham, has been appointed surgeon to the Royal London Ophthalmic Hospital. W. H. Brazil has been appointed ophthalmic surgeon to the Stratford-upon-Avon General Hospital. C. Killick, late of Maidstone, has been appointed surgeon to the Bradford Royal Eye and Ear Hospital. Alfred E. A. Loosely has been appointed assistant surgeon in the ophthalmic out-patient department at the London Temperance Hospital.

Col. Casey A. Wood, M. R. C., was recently surprised, deeply gratified and much touched by a letter from Mrs. John Couper, of London, England, in which he was informed that her husband (an old friend and teacher of Dr. Wood's) had bequeathed to the Doctor his own well-worn ophthalmoscope. This is the famous instrument which Mr. Couper used for so many years, and around which, for all the old-time students of Couper, there cluster so many very pleasant associations. The instrument is a "Couper ophthalmoscope" in even a secondary sense, being one of the long, slender ophthalmoscopes invented by Couper and supplied with the familiar endless chain of lenses subsequently adopted by Morton as the essential mechanism of his, perhaps, more widely known ophthalmoscope. The instrument will be mounted in a specially prepared case, and, so protected, will, together with the letter of Mrs. Couper and the biographic notice of her distinguished husband from the pen of Dr. Thomas Hall Shastid in this JOURNAL be presented to the Library of McGill University.

MILITARY NOTES.

Dr. George F. Suker, Chicago, has returned from military service to private practice.

Dr. Vard H. Hulen has returned to San Francisco after several months active duty in France.

Dr. Harry S. Gradle released from military service, has resumed practice at 22 E. Washington St., Chicago, Illinois.

Dr. Alexander D. McConachie, of Baltimore, announces that he has returned from France, and has resumed practice of ophthalmology and oto-laryngology.

Dr. H. W. Dudley has opened an office in San Francisco. Dr. Hans Barkan of San Francisco, will return to private practice on July first, after receiving his discharge from the army.

Lieut.-Col. Edward C. Ellett of Memphis, Tenn., who was commanding officer of Base Hospital Number 115, returned home about May 15th from his service overseas.

We are sure that all ophthalmologists who have returned from the service, have not been reported to us. Those who have been overlooked will confer a favor by so advising us.

Major Charles A. Bahn, M. C., Tulane University, New Orleans, formerly Adjutant Base Hospital 24, Ophthalmologist Base Hospital 24, and Consultant in Ophthalmology Limoges Hospital Center, is now visiting the eye clinics of Paris and assisting in the instruction of American officers studying there. Major Bahn is preparing an article on "Ophthalmological Paris" to be published shortly.

SOCIETIES.

Dr. Arthur J. Bedell, Albany, was appointed Chairman and Dr. I. W. Voorhees, New York City, Secretary of the Eye, Nose and Throat Section at the recent meeting of the New York State Medical Society.

Dr. Frank Allport, Chicago, was elected President and Dr. Chas. F. Burkhardt, Effingham, Secretary of the Eye, Ear, Nose and Throat Section of the Illinois State Medical Society.

The annual meeting of the Ophthalmological Society of Egypt met on Friday, March 7th, 1919, one day only, at Cairo. The paper on "Causes of Blindness in Egypt," read by Dr. A. F. MacCallen will appear in full in an early number of this JOURNAL.

MISCELLANEOUS.

"The National Committee for the Prevention of Blindness," Inc. leads the movement for the conservation of vision in the United States, publishes the facts about needless blindness and how to prevent it, plans campaigns of education and advises the workers, provides the literature with which to educate the people, promotes legislation for protecting helpless infancy from the great calamity of being made blind, and carries on relentless warfare on trachoma, wood alcohol poisoning, industrial accidents, harmful lighting conditions, and other causes of impairment of vision. This committee has members in every state in the Union, and in many foreign countries, and is glad to welcome everyone interested in this most necessary work of preventing needless blindness and deterioration of sight.

OPHTHALMIC LITERATURE

These lists contain the titles of all papers bearing on Ophthalmology received within the preceeding month. These titles are all in English, some of them modified to indicate more clearly their subjects. These subjects are grouped under appropriate heads, the succession of groups being the same from month to month. In the group the papers are arranged alphabetically usually by the name of the author in heavy-face type. After the subject of the paper (Ill.) indicates the number of illustrations. (Pl.) the number of plates, and (Col. pl.) colored plates illustrating the article. (Abst.) shows that it is an abstract of the original article. (Bibl.) tells that the paper is accompanied by an important bibliography. (Dis.) means that a discussion of the subject is published with it. Under Repeated Titles are indicated additional publication of papers already noticed. To secure the earliest possible notice writers may send copies of their papers, or reprints, to 318 Majestic Bldg., Denver, Colorado.

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Evans, J. N. Optotype for Young Children. Amer. Jour. Ophth., v. 2, p. 425.

McClean, W. Development of a Tonometer. Amer. Jour. Ophth., v. 2, p. 417-420.

Middleton, A. B. Congenital Eye Conditions Affecting Vision Out of Three Hundred Thousand Troops at Camp Travis, Texas. (1 col. pl., 6 ill.) Amer. Jour. Ophth., v. 2, p. 377-388.

Panni, N. P. Detection of Simulated Myopic Blindness. (1 ill. Charts.) Ann. d'Ocul., v. 156, p. 219-224.

Tuttle, E. R. Eye Symptoms an Aid to Diagnosis. Florida Med. Assn. Jour. April, 1919, p. 177.

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Darier, A. Ocular Therapeutics with Vaccines. Clin. Opht., v. 23, p. 195-204.

Hata. Instillation of Chinolin in Ocular Therapeutics. Nippon Gank. Zasshi, Sept., 1918.

Ito, F. Action of Atropin on Eyes of Japanese. Nippon Gank. Zasshi, Aug., 1918.

Nolf. Intravenous Injections of Peptone in Ocular Infections. Clin. Opht., v. 23, p. 217.

Titus, K. Pyreto Therapeutics in Ophthalmology. Clin. Opht., v. 23, p. 205.

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Rutherford, L. T. Lacrimal Gland in Surgical Anesthesia. Lancet, May, 1919, p. 792.

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Andrews, M. P. Psychology of Refraction. Wisconsin Med. Jour., v. 17, p. 478.

Gardiner, E. J. Present Status of Refraction Work. Jour. Amer. Med. Assn., v. 72, pp. 1842-1827.

Pyle, W. L. Necessary but Often Neglected Refinements in Examination of Ocular Refraction. Jour. Amer. Med. Assn., v. 72, p. 1821-1824.

Suganuma, S. Pathologic Examination of Myopic Eyes. (7 ill. Bibl.) Nippon Gank. Zasshi, July, 1918.

Zimmermann, C. Fluctuations of Refraction in Developing Cataract. Amer. Jour. Ophth., v. 2, pp. 420-423.

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Bard, L. Mechanism of Nystagmus of Aural Origin. Ann. de Méd., v. 6, p. 1. Abst. Jour. Amer. Med. Assn., v. 72, p. 1874.

Benoit. Nystagmus Among Coal Miners. Le Scalpel, May 3, 1919.

Bourland. Paralysis of Superior Oblique in Diabetes. Ann. d'Ocul., v. 156, p. 225.

Santos Fernandez, J. Paralysis of Third Pair After Injury to Head. Rev. de Cubana de Oft., v. 1, p. 280.

Theobald, S. Correction of Muscular Anomalies of Eyes. (Dis.) Jour. Amer. Med. Assn., v. 72, pp. 1827-1831.

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Archibald, R. G. Epithelial Xerosis of Conjunctiva in Natives of Sudan. Jour. Trop. Med. and Hygiene, London, v. 22, p. 81. Abst. Jour. Amer. Med. Assn., v. 72, p. 1793.

Dwight, C. G. Trachoma. Wisconsin Med. Jour., v. 17, p. 485.

Fernandez, F. M. Provoked Conjunctivitis. (Bibl.) Rev. Cubana de Oft., v. 1, pp. 343-347.

Gallemaerts. Congenital Bulbar Conjunctival Cyst. Ann. d'Ocul., v. 156, p. 218.

Hiwatari. Origin of Lymph Follicles. Nippon Gank. Zasshi, Sept., 1918.

Inouye, T. Trachoma of Limbus. (4 ill.) Nippon Gank. Zasshi, Aug., 1918.

Ishida, L. Lymph Glands in Episcleral Tissue. Nippon Gank. Zasshi, Dec., 1918.

Ishiwara, S. Roentgen Ray in Parinaud's Conjunctivitis. Nippon Gank. Zasshi, Sept., 1918.

Ito, F. Bacteriology in Eye Diseases. Nippon Gank. Zasshi, July, 1918.

McFarlane, D. Colloidal Manganese in Gonorrheal Ophthalmia. Brit. Med. Jour., April 5, 1919, p. 404.

Myake, F. Amyloid Degeneration of Conjunctiva. (1 col. pl.) Nippon Gank. Zasshi, Nov., 1918.

Pacheco Luna, R. Prophylaxis of Blennorrhagia Neonatorum. Rev. Cubana de Oft., v. 1, p. 292.

Trachoma in Guatemala. Rev. Cubana de Oft., v. 1, pp. 300-305.

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Sauri, R. Treatment of Pterygium. Rev. Cubana de Oft., v. 1, p. 337.

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Masuda. Pathology of Diffuse Superfical Keratitis. (6 ill.) Nippon Gank. Zasshi, Oct., 1918.

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Inequality of Pupils. Jour. Amer. Med. Assn., v. 72, p. 1867.

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